CULTURAL DEVELOPMENT

Social Studies: Course II - Unit II

Student's Manual

Prepared by the Social Science Curriculum Study Center, University of Illinois Curriculum Laboratory, 1212 West Springfield Avenue, Urbana, Illinois, for use in University High School and Selected Public Schools Cooperating in Field Testing the Materials.

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UNIT II - CULTURAL DEVELOPMENT

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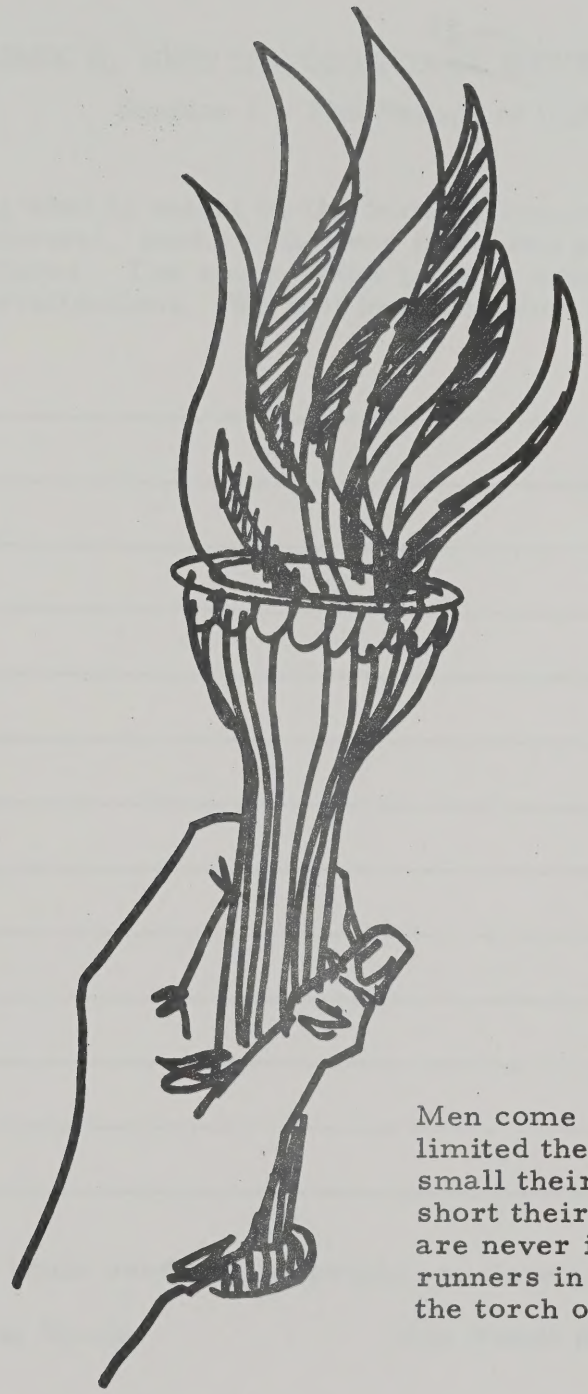

Men come and go, but however limited their individual strength, small their contribution, and short their life span, their efforts are never in vain because, like runners in a race, they hand on the torch of life.*

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THE NATURE OF CULTURE

COURSE II, UNIT II - CULTURAL DEVELOPMENT

Section 1 - The Nature of Culture

1. While studying what is meant by the term or concept "culture" and for the rest of the semester, seek to discover ideas and generalizations about culture or cultures. The space below is to be used for a listing of these ideas and generalizations. We will have occasion to refer to this listing often.

_____

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_____

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2. List below the basic needs of the people you have just "met."

Individual Basic Needs	How Needs Satisfied

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_____ _____

_____ _____

_____ _____

_____ _____

b. How do the needs of these people compare with your basic needs?

c. Indicate above how these people satisfy their needs. How do the ways they satisfy their needs compare with the ways we satisfy our needs?

3. Write a well-worded definition of "culture" below. What does the term mean to you?

4. Your teacher will play "The Museum of Man," a record telling about some of man's activities. The museum described in this record is a very unusual kind of museum. Listen carefully to what Mr. Goldschmidt, the narrator, tells you about the categories of things which every society must provide for man and list below the categories he mentions:

Categories	Examples in our Culture

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THE NATURE OF CULTURE
Eskimos Today

The Angmagssalik Eskimos and Thule Eskimos were isolated from European or American influence longer than other groups and hence carry on many of the "old ways." They have also seen some changes in their way of life, however, the Angmagssalik Eskimos as a result of Danish developmental programs and the Thule Eskimos as a result of Knud Rasmussen's trading post and the Thule Air Base (U.S.)

Canada:

The Canadian Eskimos were isolated from "white" contact longer than other Eskimos groups. It is the culture of Canadian Eskimos that has generally provided the basis for descriptions of traditional Eskimo culture, which includes such characteristics as small dispersed settlements and seasonal migration (because of the limitation of game in a given local area), snow houses, sea mammal and caribou hunting, collecting, seasonal fishing, etc. (Among the Canadian Eskimos there never were--except on Labrador--permanent villages such as were found in western Greenland or on the Bering Sea coast of Alaska or Siberia.) Because of this long "isolation," greater changes have occurred in a shorter time (especially since World War II) in Canadian Eskimo culture than in Eskimo culture elsewhere.

Before World War II, there were mineral and oil prospectors, traders, and missionaries in Eskimo territories. The missionaries operated a number of welfare programs and schools. Through the traders the Eskimos were introduced to "white" goods and found a market for their fur pelts. Some of them began to congregate around trading centers.

Since about the time of World War II, the Canadian Department of Northern Affairs and National Resources has supplemented the welfare efforts of the missionaries and has provided the Eskimos with schools, medical centers, and relief payments to "tide them over" in difficult years.

After World War II, Eskimos began moving in larger numbers from their scattered settlements and congregating in more permanent villages. Three areas of such congregation were Frobisher Bay, the Mackenzie Delta area, and the shores of Hudson Bay. Between 1955 and 1957 the construction of the approximately 50 stations of the DEW (Distant Early Warning) line, which stretches from western Alaska to Baffin Island (about 3000 miles), prompted additional Eskimos to congregate around these stations. It also illustrated to the Eskimos the technological culture of the outside world and its degree of control of the environment.

The congregation of the Eskimos in larger settlements led to a number of things. One of these was an increase in their susceptibility to sickness. Tuberculosis became the worst killer of the Eskimos. (Before, the Eskimos had been like other "underdeveloped" peoples of the world, having high fertility and high morality.) Also, Eskimos from many different small groups came together, leading to changes in some customs and to more intermarrying among more groups than had taken place before. Also, the smaller bands that had existed earlier had often consisted of a father and his wife, their sons, and their sons' families. Now, the relatives on the women's side, (as the relatives of the sons' wifes), if they lived in the same community, became more important than they had been before.

THE NATURE OF CULTURE
Eskimos Today

Much of this congregating of the Eskimos was due to their desire for wage work. Wage-earning has created changes and conflicts in Eskimo values. Wage-earners may express contempt for traditional Eskimo ways and exhibit a high degree of acquisitiveness for things (which migrating Eskimos couldn't have too many of), but, on the other hand, they may not be able to adjust to set working hours and may long to get away and hunt.

Within one group of Canadian Eskimos today there may be both full-time hunters and full-time wage-earners. Traditionally, when all the members of group were hunters, game was shared among the group members. Today game is sometimes shared but money generally isn't shared, a rather unstable sit ıtion.

Eskimo hunting has seen a lot of changes over the years. Originally the Eskimos hunted just for their own food, clothing, and other necessities. They often hunted cooperatively, since they could be more sure of getting animals that way. The Arctic fox was considered a worthless scavenger. After traders came into Eskimo areas, Arctic fox pelts became valued as something which could be exchanged for desired trade goods. Only one man was needed to set traps and so the cooperative hunting declined some in importance. When the Eskimos started using rifles, the need for cooperative hunting was lessened even more.

There are also some ecological changes that have deeply affected Eskimo life. One of these is the depletion of game, particularly the caribou, which has taken place especially after World War II. In 1907, it was estimated that there were 30,000,000 caribou in Canada; in 1955, it was estimated that there were only 277,000. This decline in caribou is the result both of excess slaughter (use of the rifle) and of a decline in spruce-lichen forests, in which the caribou feed. Thus the Eskimos have had to depend a lot more on imported foods. Another effect of this ecological change is that there are fewer foxes, (Foxes feed in part on carrion provided by caribou.), and so trapping is disrupted.

Another problem related to the caribou and to reindeer is the result of atomic testing. The caribou and reindeer have become somewhat contaminated by radioactive fallout. The lichens and sedges on which they feed show very high radioactive counts.

Relocation is being used by the Canadian government in some cases to improve the Eskimos' way of life. In some areas, where there are sufficient sea mammals and caribou, Eskimos are being persuaded to leave congested large centers and return to the older way of life. Resolute and Craig Harbor are two such "new traditional settlements." Some of the Eskimos at Craig Harbor had never even seen walruses and caribou before they were relocated! In other areas, relocation involves moving Eskimos away from areas in which there is little game left to southern Arctic centers.

The Canadian government has also attempted to encourage the development of new industries among the Eskimos. Sheep-raising and reindeer-raising were introduced with little success. Attempts have been made to manage game better and to exploit fish commercially. Canneries have been established. Eskimos have been encouraged to produce Eskimo arts and crafts for a popular and tourist market. (This has been quite successful, though Eskimo carvers feel that carving all the time becomes monotonous.)

THE NATURE OF CULTURE
Eskimos Today

Alaska:

The Eskimos of Alaska have had more and longer contact with the "white man" than the central Canadian Eskimos. Starting about 1848 and becoming heavier at the end of the century, there was intensive commercial whaling in the North Pacific and Bering Sea area. Changes occurred in Eskimo culture as the Eskimos came in contact with lawless sailors, both Russian and American, and various diseases. Much of their game was killed. With the trade that occurred, the Alaskan Eskimos got metal tools, firearms, knives, imported fishing gear, etc., long before the Canadian Eskimos.

A lot of the changes that occurred were changes in the content rather than in the pattern of Eskimo culture. The Eskimos had used good-sized boats with crews for whaling before; after contact they continued using crews but the crews were better equipped. The equipment adopted included a combined darting gun and steel-headed harpoon, a wooden whaleboat, manila rope, and, in the 1920's, a motor for the whaleboat. In southwest Alaska the fish wheel was adopted as a more efficient means of catching salmon. The rifle was readily adopted by individual hunters. (There had not been as much cooperative hunting in Alaska as there had been in Canada.)

Even before contact (as well as after), the way of life of most Alaskan Eskimos was different from the way of life of most Canadian Eskimos. In Alaska, in contrast with Canada, there was a ceremonial, work, and recreation house (used mostly by men) in most villages. Also, there was a more elaborate and more regularized public ceremonial cycle. The Alaskan art styles were more elaborate and more numerous than the Canadian. The extended family groupings and the settlements were more permanent throughout most of the year. Also in contrast to Canada, there were fewer Alaskan Eskimos dependent on caribou herds for subsistence or fox pelts for cash.

By the 1890's, missions were established among the Eskimos. The U. S. government set up schools run by the Bureau of Indian Affairs. Before World War II most Eskimo villages contained a missionary, teacher, and occasionally a trader and a nurse. In the 1920's and 1930's, representative councils (self-government) were set up in the villages. The U. S. government attempted to rehabilitate and stabilize villages and operated a number of welfare programs. During World War II many men and much material passed through Alaska and many Eskimos served in the U. S. military forces.

Since the early contacts with the white man, the economies of Alaskan Eskimos have seen a lot of changes. They have gone from subsistence hunting, fishing, and collecting to a deeper and deeper involvement in a money economy and production for sale. At first ivory, sea mammal skin, and baleen were the items sold. Then fox pelts came to the fore. After World War II, the fox tapered off. In several areas today the trapping and selling of mink and muskrat skins is a resular source of income. Some attempts were made to import Asian reindeer with Chuckchi and then Lapp herders to instruct the Eskimos in raising reindeer. In the long run, however, reindeer herding has not been successful among the Eskimos.

THE NATURE OF CULTURE
Eskimos Today

Handling and earning money is not new to the Alaskan Eskimos, though its use has greatly increased since World War II. Money was formerly obtained through the sale of pelts or crafts; now it is primarily obtained through wages, salaries, or welfare and aid payments. The trapping and fishing still continues, however, and the sale of crafts has increased in recent years.

The most dramatic intrusion of wages came with the establishment of large-scale military projects, such as the DEW line and the U. S. Navy's petroleum installation at Point Barrow. With the wages have come demands for new services and luxuries--movies, stores, etc. Few Alaskan Eskimos still live in "aboriginal" houses. Their material culture is like that of "white" Alaskans, though older people still eat large quantities of caribou and sea mammal meat. Eskimo children are demanding more education so they will be better off economically later on.

There is a trend among the Alaskan Eskimos toward fewer and larger settlements. Many inland Eskimos have moved to the coast. Earlier there had been trade between the coastal and inland villages (sea mammal oil for caribou hides), but this dropped off when imported textiles became common on the coast and the whales and walruses declined. (Thus today the caribou herds have increased since there are relatively fewer Eskimos inland.) Many Eskimos have moved to the urban areas of Alaska and some have even moved into the "southern forty-eight." The U. S. has made little attempt to relocate Eskimos in environments similar to their traditional ones as Canada has done.

There have been a number of recent changes in Eskimo life. In some areas the extended family is still the important economic and social unit, but in other areas individualization has set in. Now even the members of a whaling crew are not necessarily related. Husband-wife ties have become relatively stronger and father-son ties relatively weaker. The men's house has almost disappeared and other integrative centers, such as the church, school, coffee-house, movie theater, and store, have taken over its functions. New leaders are often those who have had education and who can handle English well rather than whaling captains or traditional religious leaders, (though whaling captains are often still the leaders in the north). As there is more travel and exposure to the outside, people don't marry within the village as much as they used to. Gains have been made in recent years in controlling tuberculosis and the death rate has declined somewhat.

Siberia:

The Eskimos who live in Siberia on the western shores of the Bering Sea have also seen some changes in their way of life due to contact with "white ways." As in Alaska, whaling ships and fur traders stopped and dealt with the natives. American influence of this sort was strongest between the mid-1800's and the 1920's. Contacts and visiting between these Eskimos and the Eskimos of Alaska, however, were relatively frequent until the 1930's and continued as late as 1944, when they were strongly discouraged by the Soviet government.

THE NATURE OF CULTURE
Eskimos Today

The Siberian Eskimos were long neglected by the Tsarist government. It wasn't until the Communist Revolution that Russians took an interest in changing the Eskimos' way of life. In 1925 schools giving literacy, technical and political instruction were established, and in 1928 large scale cultural and sanitation work and a cooperative were begun. The first Eskimo collective, "Novaya Zhizn," was started. With collectivization work groups were organized for such activities as reindeer herding, fishing, and hunting. Health and sanitary facilities were improved, and local political groups were established. "Plans" were set up to increase production.

The present-day economy of the Siberian Eskimos is primarily based on reindeer herding and sea-mammal hunting. There is also some trapping and processing of useful products from animal skins. The government has tried to improve reindeer herding by organizing workers into "brigades" and by establishing special schools to teach better herding methods. Better technical equipment (motorized whaleboats, ammunition, better hunting weapons, etc.) has been supplied to the Eskimos to make the sea-mammal hunt more efficient.

The collective Novaya Zhizn provides an illustration of this way of life. In the winter the hunters in this collective hunt seals individually. Thirty percent of each kill is given to the collective and 70% is kept by the hunter for his family. Whale boats and schooners for hunting walruses are furnished by the government. The walruses are killed with lances so they won't be frightened away by gunshots. Brigades of 4 to 6 men trap foxes. Fishing is not highly developed in this collective but some salmon and navaga are caught with seines and stationary nets. The women of the collective gather wild products, catch fish, and process the sea mammals.

These Siberian Eskimos live mixed in among or very near coastal Chukchis and most Eskimo adults speak Chukchi. Among them until recently were fully developed patrilineal clans (related in the male line). Their residence pattern was similar to the residence pattern of the Angmassalik Eskimos--one large dwelling was inhabited by several families.

Recent years have seen the construction of one-family wooden houses; seven years of education for all in Eskimo and then in Russian; the establishing of schools to train such specialists as collective leaders, radiomen, and mechanics; medical clinics and three hospitals on the coast. Handicrafts made by the Siberian Eskimos today include the traditional bone carving and reindeer hair and thread embroidery. The Russians discouraged all traditional native religious beliefs and practices, but some of these still existed as recently as ten years ago. Are traditional criteria for membership in groups still operating? It would be interesting, for instance, to know whether boat crews are still made up of clan members. This data is not now available, however.

7 (continued)

a. Use the following chart to illustrate some of the differences existing among different groups of Eskimos today. Fill in to the left the characteristics you wish to compare.

Characteristic	Greenland Eskimos	Canadian Eskimos	Alaskan Eskimos	Siberian Eskimos

b. Why do you think these differences exist? List your reasons below:

(1)

(2)

(3)

(4)

(5)

(6)

(7)

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c. What are some changes which have been readily adopted by Eskimos? Have any other changes resulted from these? What?

d. Does what you learned about Eskimos today support or refute any of the generalizations you made about the relationships of culture and environment? Which ones? Explain.

8. Read Parts 1, 2, and 3 of "In the Wake of the Wheel" by Wesley Bliss, pp.23-27 in Edward H. Spicer, Ed. Human Problems in Technological Change. You may use this space to take notes on your reading.

Answer the following questions:

a. In what ways (for what activities) do you think the Papago Indians used the wagons?

b. What are some of the changes that having wagons brought to Papago culture?

c. Why do you think wagons were readily adopted?

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d. Now read parts 4 and 5, pp. 28-32, of "In the Wake of the Wheel." In the space below revise and expand your answers to questions a, b, and c.

9. As a class, choose one new thing or way of doing something that might be introduced into and adopted by people in our culture.

The class chose _____.

Now list as many changes in our culture as you can that would result from the adoption of this new thing or way of doing something.

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EARLY MAN

1. Where do you think man originated?

Read the following article, "Leading up to Modern Man: One Interpretation of the Fossil Record," and study the illustrations on pages 6, 7, 8 and 9, and 12 in the "Tools and Human Evolution" reprint. Be prepared to discuss the following questions in class:

a. What are the characteristics which have been considered important in distinguishing the early men of one stage from those of another? List them below.

b. Fill in the chart in the space below, indicating the physical and cultural characteristics in the stages indicated:

Characteristic	Australopithecine	Pithecanthropine	Neanderthal	Modern

c. Looking across the chart you have filled in, can you make any guesses as to <u>why</u> some of the changes occurred from stage to stage?

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Leading up to Modern Man: One Interpretation of the Fossil Record*

The fossil evidence for human evolution may be divided into six groups: Proconsul, Ramapithecine, Australopithecine, Pithecanthropine, Neanderthal, and Modern. These groups represent different stages in man's development.

About fifteen million years ago, there existed in East Africa a kind of generalized ape known as Proconsul. The best-known fossil of this ape, almost a complete skeleton, is about the size of a man. Proconsul lived partly in the trees and partly on the ground, not being specialized for either way of life.

About ten million years ago, the first man-like creature or hominid, known as Ramapithecus, lived in East Africa and also as far from this area as India. Man-like creatures were spreading out geographically. Two upper and one lower jaw of this hominid have been found.

Remains of the Australopithecines have been found in East Africa, South Africa, the Lake Chad area, Palestine, and Java. These hominids existed as early as two million years ago. They had relatively large molars compared to the molars of modern men, and they lacked the projecting canines typical of apes. The pelvis of the Australopithecines was almost like the pelvis of modern man, so we know they could walk "erectish" for fairly long distances. Their cranial capacities were generally at or below 650 cc. (The brains of anthropoid apes today may get this large, but it must be remembered that the Australopithecines were smaller than anthropoid apes today, and so their brains were proportionally larger in relation to their body size.)

The Australopithecines used culture as their major means of survival. They used tools of stone (mainly river pebbles with some chips knocked off). There were two types of Australopithecines--an earlier, smaller, and lighter type called Australopithecus and a later, larger, and heavier type called Paranthropus.

By about 400,000 years ago, another form of hominid had come to the fore. This new type of early man has been called Pithecanthropus (or Homo erectus). The Pithecanthropines had larger brains (about 900 cc) in proportion to the rest of their bodies than the Australopithecines. Their molars were smaller than the molars of Paranthropus and fall within the upper size limits of the molars of modern man. Their skeleton below the neck was pretty much like modern man. They really did walk erect. The greatest number of Pithecanthropines have been found in the Far East, though some have also been found in Africa and Europe. The first Pithecanthropine fossil was found in Java in the 1890's by a man named Dubois. Probably the most famous Pithecanthropine fossils were found at Choukoutien cave near Peking, China. This cave showed evidence of consistent use as a campsite in Pithecanthropine times, indicating that there was some division of labor taking place. ("You go that way and I'll go this way to look for food and we'll meet back at the cave.") Also, and even more important, there are indications that the Choukoutien cave-dwellers, called "Sinanthropus," knew how to use fire. With fire, man's ancestors could move into colder areas and could occupy rock shelters and caves in safety. (Before, caves sometimes became traps.)

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*The information used in writing this article was primarily drawn from Brace, C. L., and M. F. Ashley Montagu, Man's Evolution. (New York: The Macmillan Company, 1965).

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EARLY MAN
Leading up to Modern Man

By about 150,000 years ago, before the last big glaciation, Neanderthal-type men were inhabiting much of the Old World south of about 60° N except for some desert and tropical forest regions and for some of the islands south and east of Asia. Many of the remains of Neanderthal men have been found in Europe. When a lot of people think of the name "Neanderthal," they think of a hairy, stooped-over creature with a gorilla-like face and a blank expression who is sporting an animal skin held up by a strap over one shoulder and is lugging a large stick like an enormous baseball bat. This picture of Neanderthal man is absolutely incorrect. Neanderthal man stood just as erectly as modern man. His cranial capacity was 1500 cc, larger than modern man's (1350 cc). The only significant differences between Neanderthal and modern man were in the face and teeth. Neanderthal had a larger face with larger brow ridges and larger front teeth than modern man. He used his teeth so often and for so many things, though,)perhaps even for softening and tanning animal skins), that they often got very badly worn down.

Neanderthal men were able to survive in the temperate zone in some numbers even during the last glacial period. They lived in rock shelters and caves and undoubtedly used clothes as well as fire to keep warm. During the time of Neanderthal, there was an increase in the number and variety of cutting and manipulating tools, Neanderthal was also the first type of early man known to bury his dead. Also, the faces and parts of the bodies of the dead were painted with red ochre. Perhaps the Neanderthalers had a system of religion and some belief in an afterlife.

Evidence of the first appearance of modern-type men, Homo sapiens, is sketchy. There is also the problem of where one should draw the line between Neanderthal and modern men. It is evident, though, that, from the time of Neanderthal, there was a decrease in skeletal robustness, a decrease in the part of the face related to the jaws and teeth, and the development of an overbite. With metal utensils to cut meat and more vegetable food in the diet as a result of the agricultural revolution, man didn't need the edge-to-edge bite as much.

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2. Read the article "Tools and Human Evolution." After you have read it, answer the following questions:

   a. What changes occurred in man's physical structure during the course of evolution? Check p. 75. List the changes below.

   b. Choose one change you listed in a. above and describe how this change helped man to adapt better to his environment.

   c. What advantages did tool use confer on early man?

   d. In the article it states that "Tool use is both the cause and effect of bipedal locomotion." (Remember, bipedal locomotion refers to walking on two feet.) How can it be that tool use is both cause and effect? How would you explain this quote from the article in your own words? You may want to use examples in your answer.

   e. Prepare a summary statement about the relationship of man's physical nature (his body structure, etc.) and his culture in his evolution. Indicate by giving examples, how the data of man's evolution upholds your statement.

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3. a. How does evolution happen? On page 3 of the article "Tools and Human Evolution," Sherwood Washburn speaks of "the change in terms of natural selection." On page 9, he states, "Selection is based on successful behavior." He says that the success of the new way of life of the man-apes changed the "selection pressures." What do you think is meant by the term "natural selection"? Write your ideas below. You may find that giving some examples will help to clarify your ideas.

b. Choose one physical characteristic which changed as man evolved. (Pick a different one from 3b.) Describe how natural selection was operating to favor this change. In other words, what were the selection pressures favoring the change? Why didn't the old characteristic continue?

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The Process of Natural Selection

What is natural selection? It has been said that natural selection is the process by which evolution operates. What does this mean? Let's look at some examples of natural selection in operation.

In California the scale insect attacks citrus trees. For a time hydrocyanic acid was effective in killing most of these insects, but after a time insects resistant to the acid began to multiply and pass on the resistance to acid to their children. These acid-resistant insects made up a larger and larger proportion of the scale insect population. The acid was no longer effective in controlling them. The same thing has been found to be true of flies and DDT and of viruses and penicillin. The DDT and penicillin seem to have lost their effectiveness and more powerful poisons and antibiotics must be used.

In industrial areas in England some years ago, it was noticed that the dark colored moths found in populations of mainly light-colored speckled moths were increasing in numbers. Soot from the industries had blackened the tree trunks where the moths alighted, and birds could see and catch the light colored moths more easily than the dark ones. Thus more of the dark moths lived and passed on their dark color to their offspring. The light moths no longer "blended in" and so not as many of them as before lived and passed on their lighter color to their offspring.

What can we glean from these examples that will help us to understand natural selection? First, it can be seen that there is always a wide range of variation in any population. There had to be, originally, at least a few scale insects resistant to hydrocyanic acid and at least a few dark moths for these resistant scale insects and dark moths to be able to increase proportionally in the populations of scale insects and moths. We can look around us and see a wide variation in people, too. Among us are light-haired and dark-haired, dark and light-complexioned, intelligent and not-so-intelligent people. We come in all shapes and sizes. This was probably true of our ancestors, too.

It can also be seen from the above examples that some individuals adapt better in their physical characteristics to their environmental situations than others. The DDT-resistant flies adapted better to an environment containing DDT. The dark moths adapted better to the soot-blackened trees. This is true with people, too. Some people have hereditary diseases such as hemophilia (a disease in which the blood does not clot as it should) and pass these diseases on to their children. These children are not as well adapted to an environment in which they might cut themselves as children who don't have the disease. Skin color in people is adaptive, also. People with dark skins can get along better where there is a lot of intense sunlight than people with lighter skins. Those of you who are very fair-skinned and blue-eyed, . . . what would you look like and how would you feel if you had to spend even a full week in intense sunlight?

There are always more individuals born in every population than can live. Every organism needs food and other resources in order to live. Resources are limited. So what happens? Some individuals die. Those individuals who die are just not able to adapt to their environmental situations. Some people, for instance,

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may be born with variations such as malfunctioning kidneys or defective hearts that will not enable them to carry on bodily processes necessary in the kind of environment in which we live.

Natural selection has been called the "survival of the fittest." This term plagued Charles Darwin, who so amply documented the workings of natural selection in his book The Origin of Species, published in 1859. The term probably partially results from the ideas of Malthus regarding human populations. Malthus had noted that in the England of his day there were natural checks on human population. These checks were disease, wars, and poverty. Only the "fit" could survive.

In evolutionary terms "fitness" means something different from the way we use the word in everyday speech. When we usually use the word, we are referring to "being in shape," being strong, or being well. In evolutionary terms, however, "fitness" refers to reproductive fitness. Thus the fittest viruses were those that lived and reproduced. The fittest moths were those that reproduced, passing on their dark color to their progeny. This is true of people, too. Those who are the "fittest" in Darwinian terms are those who have the most healthy children who have the most healthy children, etc. A man may get along well in his environment, but if he has no children, his physical characteristics will not be passed on to future generations. Thus the reproductive success of a species--any species--determines the future of the species.

We think in terms of large populations when we think about how natural selection operates in evolution. We spoke earlier about how DDT-resistant flies were increasing proportionately in the populations of flies exposed to DDT and about how dark colored moths were increasing proportionately in the total moth population. The same thing works for human beings, but our human generations (reproductive life spans) are so long that it is difficult for us to see natural selection in operation in human populations except among small breeding groups that have been isolated from other people.

Natural selection is really a very complex process. Think of all the different kinds of living things in the world. All living things are undergoing natural selection. They are continually adjusting to each other. When the situation to which a population of insects or dogs or people is adapting changes, then the process of natural selection operates to change the population to fit the new situation. This means that other kinds of living things in the same environment have to change, too. When man-apes first learned to use tools with their hands, selection pressures relaxed for large canine teeth and favored hand-eye coordination. The man-apes could throw stones to defend themselves and to kill game instead of relying on slashing with their teeth. So more man-apes with small canine teeth lived and reproduced, and gradually large canines began to disappear from the population. (We don't need them today, either; we use bombs and machine guns.) Man-apes could kill more animals with stones than they could with teeth, so their diet includes more meat and less vegetation. This meant that animals had to become wilier or swifter--better able to get away from man--in order to survive. It also meant that more plants could grow longer and proliferate.

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EARLY MAN
The Process of Natural Selection

The process of natural selection operates on an extremely large number of traits at the same time. Sometimes the forces favoring one trait are operating against another trait. Thus the various features of the organism must reach a compromise.

You may wonder whether the forces of natural selection even operate on man any more. After all, man can adapt to his environment via his culture. He can cover fair skin with clothes and can protect his body from the cold by building and heating houses. And, what is more, he can pass on knowledge of how to do things by cultural means. Man learns. He doesn't have to rely on genetic transmission. Or does he?

Tuberculosis spreads faster among people when they are crowded close together, as they are in many cities. People in the cities who would be most "evolutionarily fit" would be those who are resistant to tuberculosis. Is man gradually becoming more resistant to TB?

Also, when people live close together, they must be able to cooperate with each other. Are the forces of natural selection operating to increase man's ability to cooperate? Some individuals, though, seem to make their way by being aggressive and uncooperative. They have children, too. Are the forces of natural selection operating to perpetuate this kind of behavior? How much is behavior controlled by heredity?

With all the advances in technology in our society in recent years, it is more and more necessary to have advanced training to get a well-paying job. Thus survival in our society is defined in terms of the knowledge and technical skills required to get a job. It takes a certain amount of intelligence to be able to master this knowledge and these skills. If characteristics inherited from our parents affect our intelligence, as is probably partially the case, is natural selection operating to increase intelligence in the American population? Or are our medical advances and technology allowing the less intelligent to survive, thus decreasing intelligence in the American population?

It seems that in the above case we can speak of a sort of "cultural selection." The following example would also be "cultural selection." Suppose having blue eyes were to become extremely popular. Men would want to marry women with blue eyes and women would want to marry blue-eyed men. More blue-eyed children would be born. The percentage of blue-eyed people in the population would increase. Thus the fashion (which is culturally based and is learned) would have resulted in a change in a physical characteristic--eye color--in the population.

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EARLY MAN

4. a. On the following page is a world map. Indicate on the map the known geographical spread of man during the various stages in his development. (See the article "Leading Up to Modern Man.") You may want to use different colors in marking the map.

   b. Man probably originated in Africa, but today he is spread all over the globe. Why did he spread so widely?

   c. How do you think he was able to spread into and adjust fairly readily to so many different environments?

   d. When did man come to the New World and how did he get here?

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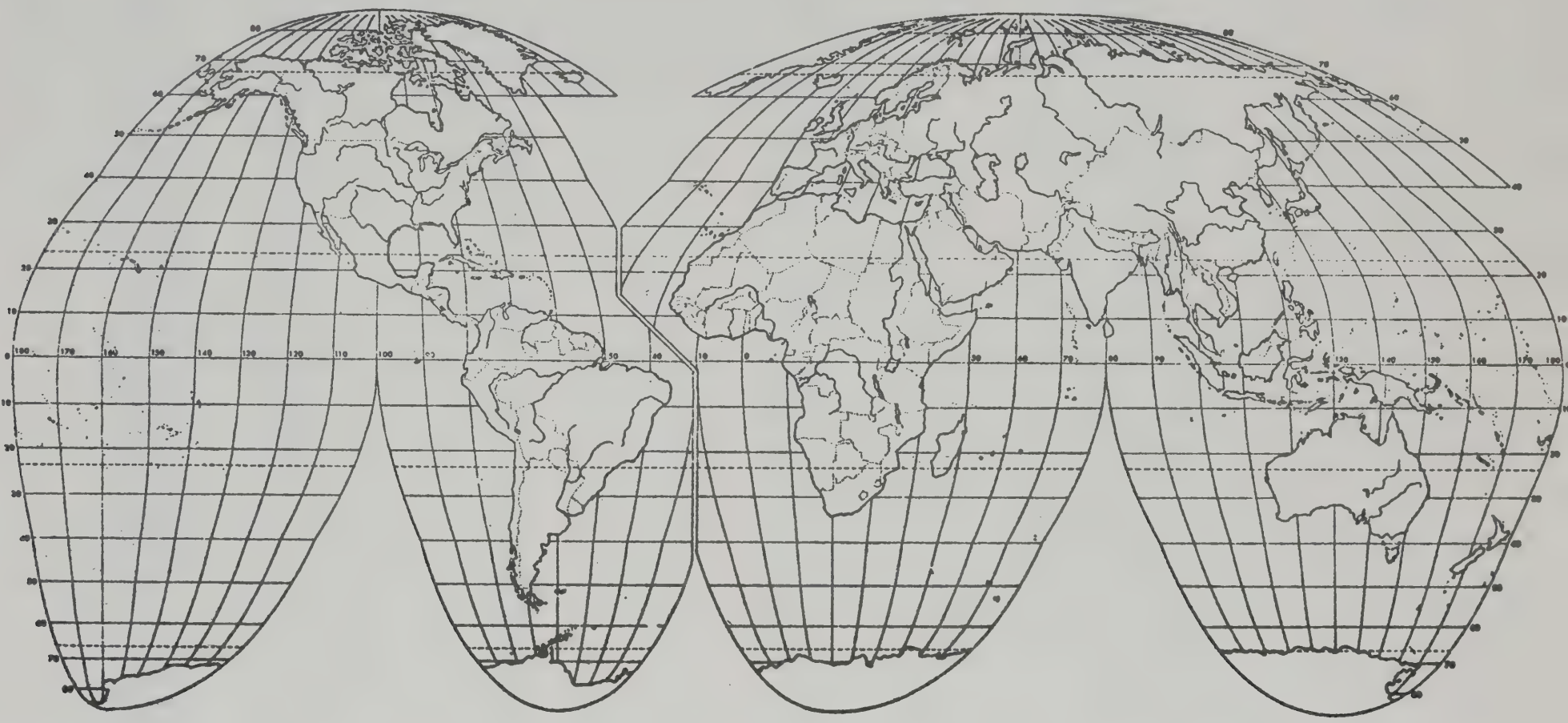

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Capsule History of Early Man

500,000 years ago, at the onset of the first glaciation, most of man's waking hours were spent searching for food. He ate fish, wild roots and vegetable plants, nuts, berries, and other fruit. He also ate whatever animals he could kill. At first he ate a lot of very small animals or animals which were too old or sick to elude him. Later he learned to follow animal migrations and to hunt in groups. With a whole group of hunters, animals could be surrounded or run off a cliff or into a corral and so more could be killed with less effort.

By 300,000 years ago man was living in natural shelters near the raw materials, food, and water that he needed. He had learned to make and control fire. This seems to us a small accomplishment as we turn a knob to heat our houses and cook our food. Have any of you started a fire by friction, though? It is not too easy, is it? With fire as his servant, man was able to move into colder regions that earlier had been "closed" to him. He built fire at the entrances of the caves in which he lived. He still lived in very small groups, but he had developed the hunt almost to an art, outsmarting and killing animals far more powerful, swifter, and fiercer than he. Of course, his ability to make tools from bones and stones and probably also sticks extended his powers far beyond those he naturally possessed, and little, weak man began to "conquer" part of his environment, namely the great herds of animals he hunted.

Perhaps 50,000 years ago the modern physical type of man appeared. The fossil evidence indicates that this ancestor of ours was making stone blade tools as well as axes of excellent craftsmanship that gave him a greater degree of skill in his hunting and gathering. As time passed, human population increased and men were able to adjust themselves to varying environments as diverse as the tropical jungle and the arctic tundra.

About 18,000 B.C., or perhaps as early as 30,000 B.C., groups of men following large herds of Ice Age animals crossed the Bering Straits and entered the New World. Later, other groups of men crossed over. Some men even crossed back from Alaska to Siberia.

In the New World, these migrant hunters followed their game across the central plain of Alaska and south-eastward along the eastern slopes of the Rocky Mountains. These areas were relatively free of ice. From here, they gradually spread south and, as the ice melted, all over North, Central, and South America, arriving at the tip of South America perhaps as early as 8000 years ago. Evidences of these hunters have been found. In a cave in the Sandia Mountains of New Mexico, for instance, some large spear points have been found associated with the bones of prehistoric horses, bison, camels, mastodons, and mammoths. These points may date from 25,000 years ago. Artifacts of these hunters have also been found in South America associated with bones of a large extinct sloth.

It is very difficult for us to imagine how these early people lived 20 or 30 thousand years ago, hunting, fishing, and collecting whatever they could find. This first portion of human history might be looked at in the following way. Let us imagine that a day of twenty-four hours represents the 2 million years of man's probable history. (Every 100,000 years equals one hour.) At about 11:30 p.m., a few members of the human family learned to grow part of their food as well as hunt for it. Even more remarkable is that on our time scale of 24 hours of human history, only 2 minutes have been buzzing with civilization and advanced technology.

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1. a. What does an archaeologist do?

b. How might an archaeologist describe the following tools?

a.

b.

c.

d.

e.

f.

c. Group these tools into categories below. List the criteria you used in placing tools into the categories.

d. Describe several artifacts of our culture (other than those in 1b) as an archaeologist of the future might describe them.

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ARCHAEOLOGY

2. a. Looking around you or thinking about your homes, what are some things that you think might last pretty well over long periods of time--say 2000 years?

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_____ _____

_____ _____

b. Of what materials are these things made?

_____ _____

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_____ _____

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3. Read the following selection in your manual and then answer the questions following it.

What is available for the archaeologist to study is only what has survived from the natural processes of destruction and decay over time. The material things of the past which survive are those which are accidentally durable such as stone, metal (though some metals, as iron, may rust away), pottery, and other substances. Pollen from various plants is practically indestructible. Plastic and glass also last extremely well. Bones are somewhat more resistant than flesh, which rots quickly. Rope, wood, cloth, leather, skins, furs, and foodstuffs are only preserved where they have remained quite dry, as in Egypt or Arizona, under water out of the reach of bacteria, as in Northern European peat bogs or lake beds, or in very cold areas, as in the case of the Pazyryk burials in the Altai mountains of Russia. The worst environments for preservation are those that alternate between hot and cold or wet and dry.

Special conditions, as when bones are fossilized, they decay and are replaced by lime, or when carbonization occurs (when organic things are burned, then chemical composition changes and they last longer), may also help to preserve various materials.

Sometimes indirect archaeological evidence can be used to infer the existence of vanished objects and techniques. The reconstruction of timber buildings from

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the placement and proportions of the holes dug in the soil for uprights is an example of this. Impressions of cereal grains in clay pottery or in the plastering of hearths and houses can tell us a lot about the cereal crops gathered or grown by prehistoric men. Because much of the evidence about the past is so sketchy, complex techniques have been developed by archaeologists and other scientists to make the most of the evidence which is found.

So, owing to the survival of some things and not of others, we may have a very one-sided picture of the life of past societies. Fling and stone implements tell us something of the technology of early man, but we can only guess at the uses of some of the tools. We know that objects of woods, skins, and plant fibers must have been used by these people, judging from the material culture of "primitive" people that we know about today, such as the Eskimos, but these objects have not survived.

a. Have you discovered any other materials which would last well over time? If so, add these to your list on page 2.

b. Do habits or customs of people show up directly in the archaeological record? Why or why not? How do we learn about these habits or customs?

c. Does climate make any difference in what materials last and how well they last? (Give reasons for your answer.)

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4. What are some ways in which archaeological sites are found?

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5. Read the following article partly taken from "The Archaeological Survey of Missouri" in the book Indians and Archaeology of Missouri. You may want to look at some of the pictures in the book itself. Then answer the questions at the end of the article.

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ARCHAEOLOGY

The Archaeological Survey of Missouri*

Some day when you are driving down a back road near a stream, your curiosity may be aroused by the sight of several people walking across a cultivated field. They will stoop frequently, pick up something, and place it in a paper bag that each is carrying. They will seem oblivious to the surroundings, keeping their gaze to the ground as they search the fields systematically. If you should stop and inquire about their unusual actions, you might stay and join them, for they are enthusiastic people having fun looking into the past. These men and women are part of more than a thousand in the state who have archaeology as their avocation or vocation, and they are searching for the remains of the earliest Missourians.

One of the most frequently asked questions is, "How do you know where to look for Indian sites and artifacts?" The usual answer is, "Look first for a good supply of water, as the Indians had to have water close at hand." It is estimated that 80 per cent or more of the Indian campsites and town sites are located in river valleys or adjacent to springs or ot' ~ fresh water sources. Looking for a water supply is not the only ans r, because water courses have changed over the thousands of years that the Indians have lived in Missouri, the water table has lowered, and there were features besides water that caused the Indians to select particular places for their campsites and other activities.

Another question asked almost as frequently is, "What do you look for?" The answer to this is more involved, but the things searched for are generally the trash which accumulated at camp and village sites. This trash consists of broken implements, and utensils of stone, bone, shell and pottery, and flint chips and spalls that are the wastage from the manufacture of chipped stone tools. These evidences are hunted in the open fields and terraces, along the river banks, and near the mouths of caves or under overhanging ledges forming shelters that might have been used by the Indians. Mounds and other earthworks are also looked for along the bluffs as well as in the stream valleys, but they are not always easily identified as man-made, as there are many natural mounds in the state of Missouri.

[When an archaeologist looks for likely sites, he makes a survey of the area he is interested in. First he obtains the most complete map of the area that he can find. Then he must check with the owners of the property to be surveyed to obtain permission to go through their land. It is trespassing to go through someone else's land without obtaining permission. Also, in many instances the owner may know where arrowheads, mounds, or other evidences of sites may be found on his property.]

The most likely places to look for archaeological sites are in stream valleys on well-drained terraces that have been plowed and rained upon. A zigzag course across a terrace will very quickly turn up evidences of a campsite if one is there.

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*Chapman, Carl H., and Eleanor F. Chapman. Indians and Archaeology of Missouri. (Columbia: University of Missouri Press, 1964.), pp. 121-133, abridged. Reprinted by permission of University of Missouri Press, Columbia, Missouri.

Brackets - [ ] - enclose material inserted for the purpose of clarification by the SSCSC staff.

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The Indian's home was his workshop, and the by-products of tool manufacture and items broken in manufacture are commonly found on a camp location. Fragments of pottery vessels are the most common evidences in the lowland of southeastern Missouri where stone is relatively scarce. Unfinished tools and broken implements such as arrowheads, knives, scrapers, adzes, and axes are common for many tools were broken while being made or used and were discarded. Complete specimens are also found, although less frequently, for they were generally lost or misplaced rather than thrown away and are relatively few in comparison to those that were broken in manufacture or use.

[When artifacts from the surface are collected, they should be washed, recorded as to type, and kept apart by site locations.]

Once a campsite is located, there is the problem of finding its limits and mapping or measuring the site area. Soil color may be helpful because the addition of humus through camp refuse darkens the soil. In some instances camp debris is scattered continuously over river terraces or hilltops for several hundred yards, creating the problem whether or not to call the area a single campsite. The probable reason for the extensive distribution of evidence is the use of separate parts of the site for camping at different times by distinct groups of people. It is often possible to isolate the various camp locations by the concentration of evidences, each one probably representing a different campsite. Sometimes a change in the land contour such as a ravine cutting through a terrace is a means of separating one site from another. If the artifacts and other materials are very similar and are spread evenly over a large space, the logical solution is to call the entire area one campsite.

The size of the campsite is important; it has been found as a general rule that the earlier the site the smaller it is. The size of campsites tends to increase toward the historic period.

Caves and overhanging rock ledges were used as campsites by certain Indians. The places normally selected were large, dry, and well lighted. Caves generally were lived in only as far as the light from the entrance penetrated. Evidences of the use of natural shelters can be found near the opening, where water dripping from the ledges above has washed out broken tools, flint chips, and pottery sherds. The same types of material will be evident inside the cave or shelter where burrowing animals have dug them up.

Many different types of Indian sites remain to be found. Most important in making a survey is the exact location of the sites. [When a survey is made,] all of the features such as houses, roads, streams, hills, and bluffs that will help. . . place the campsite, cave, or mound [should be marked] on a map as accurately as possible. In a notebook [is recorded] a full description of the site, including its dimensions and [the] findings.

It is almost impossible to overemphasize the fact that the records of the location of archaeological sites and items coming from them must be preserved and studied before the prehistory of any area can be interpreted and described. Site locations and the artifacts found on them--or at least descriptions of them--are basic research materials and are important as historical manuscripts.

ARCHAEOLOGY

(If a site location is made or artifacts are found in Illinois, you may report this information to the Illinois Archaeological Survey:

Mr. Charles Bareis
Illinois Archaeological Survey
137 Davenport Hall
University of Illinois
Urbana, Illinois.)

Answer the following questions:

a. If you were looking for a previously undiscovered early Indian site in or near your community, where would you look? And what would you look for? Why would you look here or look for these things?

b. What is an archaeological survey?

c. Why might there be problems in marking the boundaries of a campsite?

d. Why are site locations and the artifacts found on these sites important?

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ARCHAEOLOGY

Your teacher will show some slides. You will want to take notes on these slides.

6. Read the following selection "The Archaeologist at Work" from Indians and Archaeology of Missouri and answer the questions about the reading. Note, too, the diagram of the Gamble site.

a. Why is it important to take careful notes when excavating a site?

_____

_____

_____

_____

b. List below tools and equipment of the archaeologist.

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c. What is the purpose of a datum line?

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_____

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d. What are some things we can find out about houses by excavation?

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_____

e. How does one carefully excavate a burial?

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_____

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The Archaeologist at Work*

The Archaeologist must survey a situation before beginning work on any project, whether it be the excavation of a mound, a cave, an Early Man campsite, or a Historic Indian village. He must know where the site lies in relation to the geography of the locality and to the broad physiographic area. He must also know the relationships of the site to other similar sites nearby and within the general region. Once this information has been obtained, the archaeologist is ready to begin a careful excavation of his site.

The archaeologist has no written records such as those used by the historian. He depends upon the remains of camps, villages, houses, broken pottery vessels, broken stone tools, and disturbances in the soil to furnish the clues from which the customs and habits can be interpreted and written into the description and history of the way of life of the people who lived there. The people who are studied have been dead a long time. They were never literate, so all of the history must be interpreted from mute testimony left unintentionally while the people were participating in a going, living culture.

Each archaeological site is like a chapter from the only copy of a rare old history book. There are no other copies, for in the case of the archaeological site, the available information is not exactly the same as in any other site. In a general way the items in the archaeological site are analogous to the words, phrases, and paragraphs on the pages of the history book. The arrowheads, pottery vessels, pits, houses, burials, soil color changes, and all the other evidences found in a careful excavation are as important to the interpretation of it as are the words on the pages of a book. The order in which the words are placed in the phrases, the phrases in the sentences, and the sentences in paragraphs on a page makes it possible for one to read the meaning of the words on the page. In the same manner, the association of artifacts with one another and with features such as strata, fireplaces, pits, houses, and burials makes it possible to interpret the story of what happened on the archaeological site. Artifacts alone are like words out of context from the pages of the history book. Both words and artifacts have little to offer in the way of a story unless their proper association is known. Thus, it is extremely important that archaeological excavation be done so carefully, and the association of the artifacts with all of the various features in a site be recorded so well, that the information can be reconstructed on paper and interpreted as a story of the events that took place on the site.

The tools of the archaeologist are not of a special nature, except those, such as surveying instruments, borrowed from other fields. The usual complement of excavation tools includes a shovel, a small mattock, a pointing trowel, a limber knife (a grapefruit knife), a wisk broom, a paint brush, a folding rule and steel tape, and--most important--a pencil

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*Chapman, Carl H. and Eleanor F. Chapman, Indians and Archaeology of Missouri. (Columbia: University of Missouri Press, 1964), pp. 135-145, abridged. Reprinted by permission of the University of Missouri Press, Columbia, Missouri.

and record sheets. A surveyor's instrument--an alidade or a transit--are excellent for mapping the site and may be useful for measuring levels in the site as well. A farmer's level, a hand level, or a line level may be used for determining the depths of materials from the surface. A good camera is a necessity, and it is advisable to have a tripod and flash gun equipment so that pictures can be taken at any time of day or in any situation. It is also desirable and sometimes necessary to take color photos of some of the soil profiles or features where color is important in distinguishing or interpreting the things found. It is almost impossible to have too many pictures of excavations in progress. A good photographic record with full information concerning each picture is extremely helpful in the interpretation of a site. Many times the camera will record items which the excavator overlooked or took for granted.

Excavations should not be made by untrained individuals unless they are directed or guided by a trained archaeologist, or unless an emergency--the threatened immediate destruction of the site--is involved. A word to the wise should be sufficient. Before excavating an Indian site, seek the advice of a fully trained archaeologist rather than regret the destruction of our irreplaceable archaeological resources which is the result of excavation without proper training and knowledge.

Control is the key word of the archaeologist. A controlled excavation is one that is recorded thoroughly as it is being dug. The archaeologist first sets up controls of the horizontal area. This usually involves staking the site into a grid so that all artifacts and evidences can be recorded within it. The grid system in turn is related to permanent objects surrounding the site, such as trees or houses, and these are located on a map to show the exact relationship of the site to the physiographic area. The grid may be set up in feet or meters, and almost any plan of numbering the grids is satisfactory as long as it is understandable to the one doing the excavation and to those reading about it. The system of coordinates using the directions north and east or north and west has been found to be satisfactory at the University of Missouri. Excavations are aligned with the cardinal directions or as close to them as is feasible according to the site situation. Coordinates are numbered from hypothetical base lines that are outside the probable limits of the site. Five-foot grid squares have been found to be satisfactory in the excavation, and hypothetical grid lines of 1 foot make it east to designate the grid lines 5 north, 10 north; 5 east, 10 east, and so on. A particular point on the grid might then read 5N(orth), 10E(ast), and an item located at the point would be within a 1-foot square between the grid lines 5 north and 6 north and 10 east and 11 east.

The second step after setting up the grid is to establish a means of measuring the vertical location from a hypothetical datum line, which is a level line above the site surface from which measurements can be made. The datum line can be established by using a farmer's level, a transit, an alidade, or a surveyor's hand level. The important thing is to establish a base that is a known height about the ground at that point, from which the levels are taken across the site. A stadia rod or any rod marked in inches or tenths of feet can be used to record the depths of the items. The first step is the recording of the surface of the site from the datum so that actual depths from the surface can be obtained.

Similar information can be recorded by setting up stakes at the four corners of the area to be excavated and using a line level to fix a horizontal plane from which all depths are measured.

Once the vertical level or the datum level has been established along the grid for the horizontal area, the basic control of the site excavation has been secured. This is merely the framework of controls within which the archaeologist works, and knowing the framework and how to manipulate it is the first step in actually doing the digging part of archaeology. Artifacts are only one of the things that need to be recorded in place. More important considerations are the soil context in which they occur and their association with features such as fireplaces and pits, house structures, burials, old living surfaces, working areas, and ceremonial places. These are difficult to recognize if one lacks experience and training. To know what to look for one needs a general knowledge of Indian cultures. The archaeologist must have a long period of training in which he obtains a thorough background of information concerning the Indian cultures as well as previous archaeological work done in the area and the region. He must have this knowledge at his finger tips so that it can be related to the planning and direction of the excavation of any particular site.

The excavation of a campsite or village site is usually a big undertaking. The reason for digging the site is not just to obtain a selection of the tools and implements which the people made, but also to gain a thorough description of the types of shelters they built, the pits or storage houses they constructed for preserving foods and material, and the relationship of these structures to other houses, pits, and features in the entire living area. Excavations should be guided so that enough detailed information is obtained from a house structure that its utilization by the people can be interpreted. This would include data about sleeping areas, storage places, and working sections and their use by people of different ages and sexes and by different social units, if more than one social unit occupied a house. The position of the house in regard to other houses may give an insight to the social-political structure of the village. In order to gain this knowledge a series of houses needs to be excavated on the village site. Houses should be noted in relation to defensive or protective embankments or ditches surrounding the village, if they are present, or to natural features such as river banks. The actual digging of the campsite or village site is only the beginning of the labor involved in a good archaeological excavation, as the information recovered should be so exact, so complete, that the site can be reconstructed on paper in the laboratory.

Vertical profiles are needed to show house floors or a series of occupations in a site. Horizontal profiles are necessary to find pits or postmolds in their proper relationships. For example, postmolds often define the walls and supports of a house. A horizontal profile may also show up fireplaces and evidences of other structures such as smoke pits.

The excavations of caves and shelters are similar to the excavations of campsites, with the exception that the materials are concentrated

in a smaller area and usually have undergone more disturbance from the human inhabitants and animals. In the case of cave excavations it is extremely important to make sure that all disturbances are noted and that all materials in association with them are recorded. Caves that were occupied a long time are extremely difficult to record and interpret, and a person who excavates a cave or shelter site should have several years of training before attempting this type of investigation.

Sometimes a shelter is so dry that it is difficult to use normal procedures of cutting vertical and horizontal profiles, and other methods must be devised. The occasional occurrence of perishable materials necessitates more careful work and special means of preservation. Ordinary excavation techniques can destroy fragile, perishable objects.

All investigations should involve the taking of soil samples for pollen and chemical analyses. Animal and vegetable remains should be preserved until they can be identified and reported upon by experts in zoology and botany. Charcoal may be useful for radiocarbon dating. The charcoal must be associated with the particular complex or group of artifacts in a specific occupational level in a site before it is valuable for dating purposes. Charcoal, unaccompanied by thorough records concerning its location and association with the artifacts and other features in the site, is worthless.

Mound excavations call for special techniques and methods, depending upon the type of mound and upon the area in which it is located. Many mounds have interior rock structures that were built as chambers for the entombment of the dead. A trench cut through a mound of this type would destroy a part of the structure, and might make it difficult to record. Where an interior structure exists, all of it should be uncovered first. In mounds where there are no structures, trenching through is a desirable technique. A trench from one side of the mound to its center and a carefully cut profile should furnish good clues to the mound construction. Mounds are evidence of a part of the ceremonial life of the Indians and must be viewed in this context. The investigation of a mound should be on the basis of attempting to reconstruct the ceremony that was the reason for building it.

The excavation of burials should not be a hunt for grave goods. Many Indians did not bury artifacts with their dead, and in any instance, the artifacts themselves without the information concerning the burial are of little historical value. The proper excavation of burials necessitates a knowledge of physical anthropology--the anatomy of the human body. Measurements of the skeleton should be made while it is in place. In order to do this, all bones must be uncovered very carefully and left undisturbed until measurements are made. Furthermore, the skeleton needs to be photographed before it is removed. All bones of the skeleton should be saved, and the right side kept separate from the left. It is advisable to make the bones available to a physical anthropologist for further study of any abnormality or pathology that they might reveal.

Although the position of the skeleton and the materials buried with the individual are important, perhaps more pertinent is the relationship of the burial to other burials within the cemetery area. It is from this kind of evidence that interpretations can be made concerning the use of the cemetery areas by families, clans, or other social or political groups. Only through this additional information is it possible to gain a picture of the people as they lived, believed, practiced their customs, and died.

Last and most important is a fully written report, ready for publication, describing and interpreting the archaeological sites that have been dug. If the knowledge obtained from an excavation is never made available for others to read, evaluate, and use, the excavation has been destructive rather than helpful.

Suggested Readings

Brothwell, Don, and Eric Higgs, eds., Science in Archaeology. 1963.

Champe, John L., et. al., "Four Statements For Archaeology." American Antiquity, Vol. 27, No. 2, 1961, pp. 137-38.

Deuel, Thorne, American Indian Ways of Life. Story of Illinois. Series, No. 9. (Springfield Illinois: Illinois State Museum, 1958.)

Heizer, Robert F., A Guide to Archaeological Field Methods. 3rd rev. ed. 1958.

Piggott, Stuart, Approach to Archaeology. 1958.

ARCHAEOLOGY

The following diagram illustrates how grids were laid out and excavated at one Illinois site (the Gamble site in Lawrence County near Lawrenceville, Illinois).

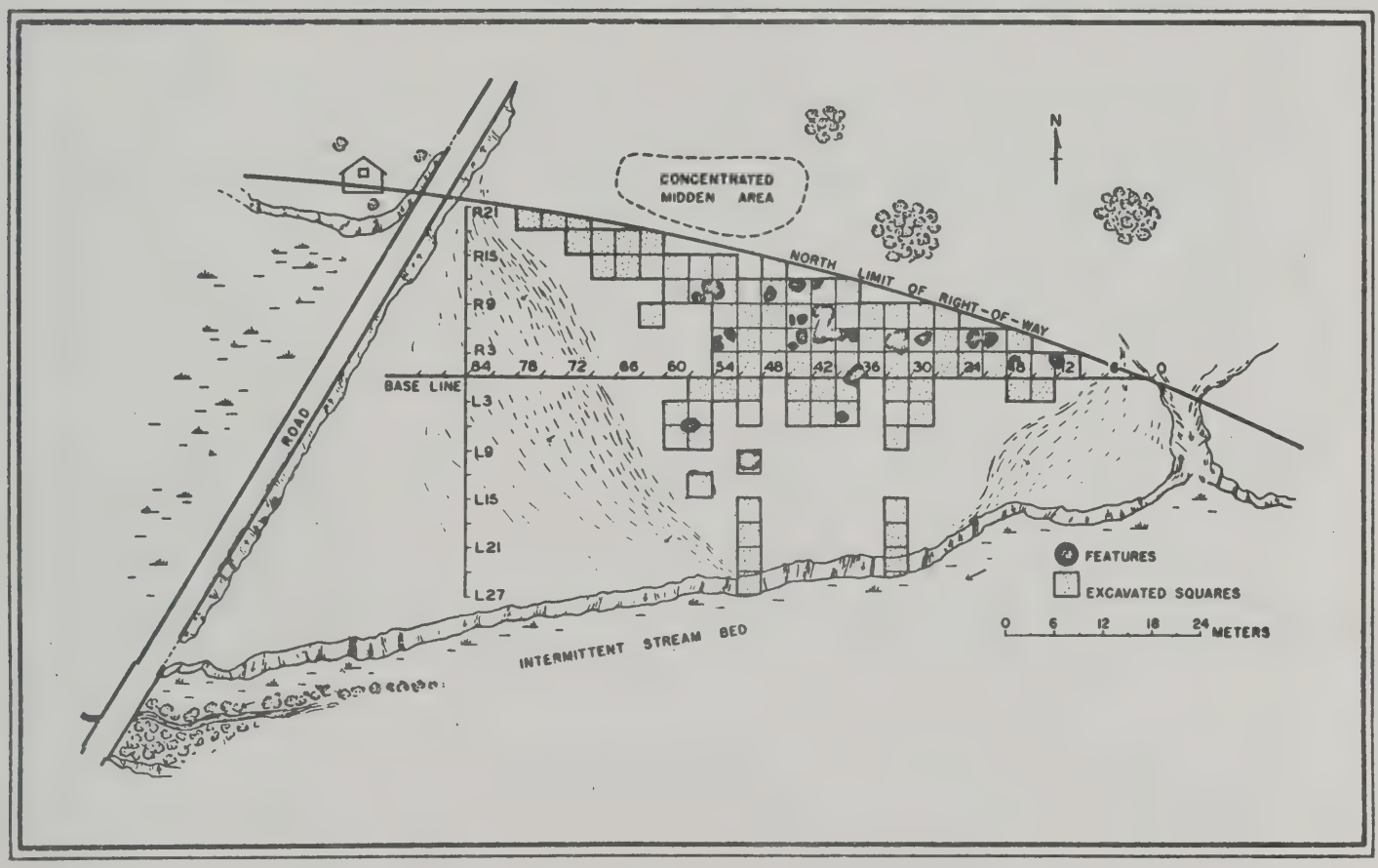

Fig. 18.--General plan of the Gamble Site showing area excavated and features.

Illinois Archaeological Survey, Bulletin No. 2. Indian Mounds and Villages in Illinois. (Urbana, Illinois: Illinois Archaeological Survey, Inc., 1960), p. 34. Reprinted by permission of Illinois Archaeological Survey, Inc.

ARCHAEOLOGY

7. a. If you were excavating an archaeological site, where would you expect to find the oldest artifacts? Why?

b. If you found two artifacts side-by-side in the same level of a site, what might you assume about these artifacts?

c. If you found three different kinds of projectile points, how would you distinguish among them?

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Stratification

If you were to empty a wastebasket, you would find that the junk on the bottom of the wastebasket was thrown into the basket earlier than the junk near the top of the basket. It is the same way with archaeological sites. Archaeologists find the remains of everything that would last through time in a number of different layers. The assemblage of things in the bottom layer was laid down earlier than the assemblage in the next layer up and so on up to the topmost, latest, layer.

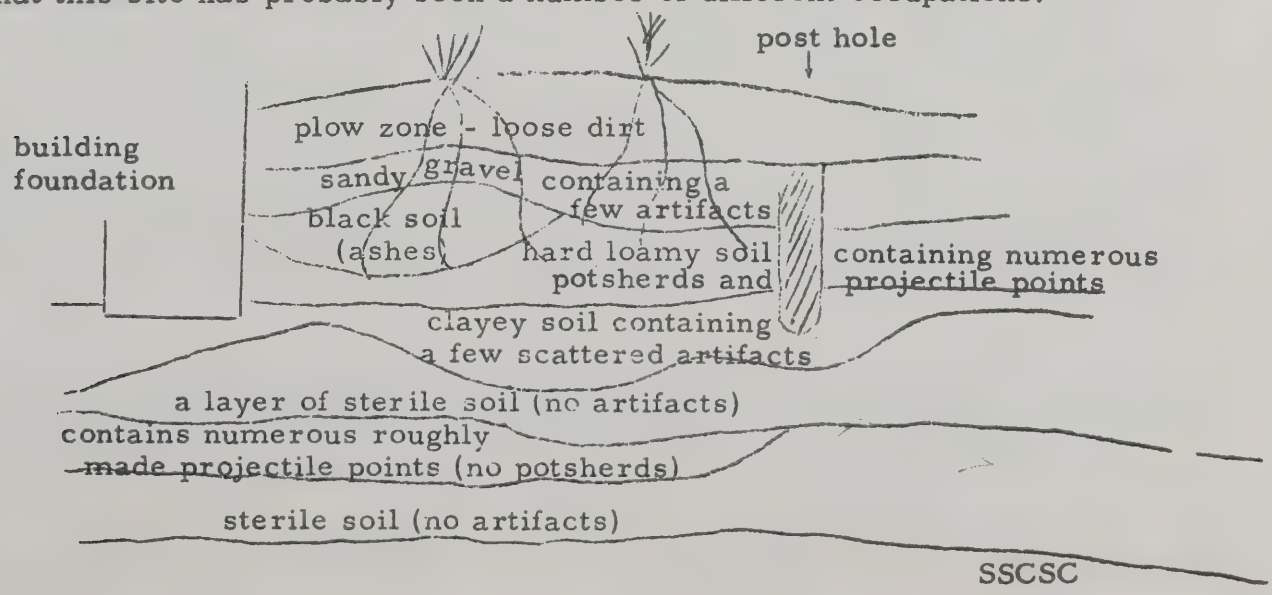
This phenomenon is called stratification. We thus say that a site is stratified.

How do these layers accumulate? The stratification, or total picture of the layers, of a site may result from a number of causes, both human and natural. The human would include the accumulation over time of the rubbish of daily living. Perhaps there were a number of successive settlements on this site. The natural would include the flooding of a river, which would leave depositions of silt; the action of worms; the growth and decay of plants on the surface; etc. Various things may intrude into these layers, too, making the total stratification picture anything but neatly delineated. Tree roots, animal burrows, building foundations, post holes, and burials may intrude into different "levels," which may be anything but level.

Stratification can tell us a lot about relative dating both within and between sites. The different layers in a site are its strata. Strata may be set off from each other because 1) they look or feel different (soil content, color, texture; such as gravel as opposed to clay); 2) one layer is "sealed off" from another (as above versus below a house floor); 3) they are a certain depth (arbitrary levels); and/or numbers of artifacts). For instance, stratum 3 in a particular site may be differentiated from stratum 4 because, in layer 3, 10% of the potsherds found are type X and 90% are type Y, whereas, in layer 4, 80% of the potsherds found are type X and only 20% are type Y.

It is not always easy to recognize strata, however. Thus it may not be feasible to follow natural or cultural strata when excavating a site. So levels of an arbitrary depth may be imposed on the site by an archaeologist as he digs.

Note the following stratification diagram of a hypothetical site. You can see that this site has probably seen a number of different occupations.



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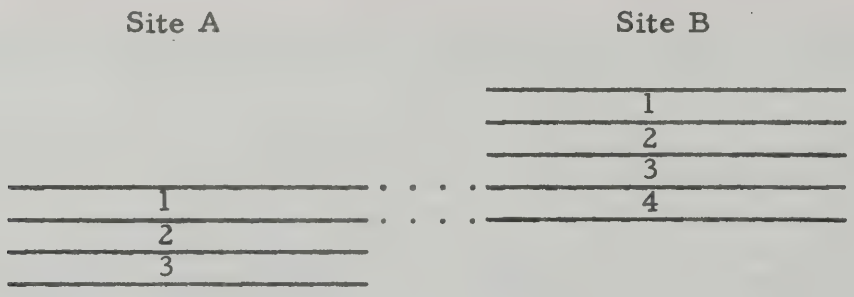
It is important in a site to recognize and note the strata in that site. The lowest stratum will be the oldest. It is possible sometimes to cross-date sites by comparing similar strata. Thus if site A and three strata, 1, 2, and 3, and site B had four strata, 1, 2, 3, and 4, and stratum 4 in site B had similar characteristics to stratum 1 in site A, we can deduce that strata 2 and 3 in site A were laid down earlier than all of site B.



Studying the stratification of a site can help in assessing the association of objects and their relative ages in this site. A comparison of the strata in all the sites in a region would yield chronological data that would be valuable in writing a cultural history for that region. Also, if one stratum of one site could be dated on an absolute scale, such as on a calendar, then other sites in the region could be dated absolutely by comparison.

ASSOCIATION

Archaeology is the study of things that "go together" or are "associated;" that is, they existed at the same time or were used by the same people. One of the most famous associations in American archaeology was discovered at Tule Springs, Nevada. Here scattered bones of extinct animals, some burned and broken, were found in the ashes of a campfire built by men 28,000 years ago. Among the bones was found a man-made obsidian flake cutting tool. By means of this association of evidences of man with extinct mammals, it was learned that man had been in the New World earlier than originally was thought.

What is 'the Archaeological Record'?*

The archaeological record does not consist of isolated monuments rising gaunt and empty from the level field nor yet of stray bits of stone, metal or earthenware turned up by a plough or a bulldozer. Such are only potential archaeological documents; however carefully planned or collected, such would hardly be amenable to archaeological classification. By themselves they would scarcely be reducible even to types. It would often be hard to determine their function, still harder to estimate their archaeological age, never possible to assign them to one society rather than another. It is only because we find lost trifles and scraps in house floors, mortuary offerings in graves, or relics in some other kind of context that they can become archaeological data. . . .

It is nearly always association with other phenomena that gives a first clue as to the use, the age and the chronological attribution of a potential datum. But age at least may sometimes be inferred from position in a geological deposit or a layer of peat. And once a type has been classified by the aid of its context, further specimens of the same type, even when found in isolation, can be assigned their place and interpreted. . . .

The archaeological context should disclose <u>association</u>. When a group of types are found together under circumstances suggesting contemporary use they are said to be <u>associated</u>. Mere physical juxtaposition does not guarantee association. A number of stone implements may turn up together in a gravel pit dug in a Pleistocene river channel. The gravel consists of debris picked up by the river and its tributaries anywhere in its large catchment area and promiscuously dumped together where the force of the current abated. There is no guarantee that all the implements included in the gravel had been made or used together or even in the same geological period; some might have

*Childe, V. Gordon. <u>Piecing Together the Past</u>. (London: Routledge and Kegan Paul, 1956), pp. 16, 30-33, abridged. Used with permission of Routeledge and Kegan Paul Ltd., publisher.

been washed out of older gravels laid down millennia earlier and then mixed with others made and used on the surface of those older gravels. Braidwood[1] describes such a fortuitous collection as an aggregate. . . .

Such a recurrent assemblage of archaeological types is technically termed a culture while being found together with, in, or containing, is termed 'association'. An obvious condition for the association of types is that they shall be in use or occupation at the same time. All types thus associated should then have the same chronological co-ordinate. But repeated association requires no less that they shall be used by the same society, that is by persons inspired by the same common tradition of wood-working, fighting, dress, domestic architecture and burial rites. . . .

Association. . . can best be illustrated by the following examples: the relics trodden into the earthen floor of a house and the house itself--in practice the house plan--constitute an assemblage of associated types; so do the mortuary offerings accompanying a single interment together with the form of the tomb, the burial rite and any traces of peculiarities of the corpse. . .

. . . The same types often recur together in a number of deposits--not only in many graves of the same cemetery or in several houses in the same village, but also in several distinct cemeteries or villages or in hoards, scattered over a continuous area. Such recurrent assemblages of types, or groups of types repeatedly found associated, constitute what are termed 'cultures'. . . , but only provided the assemblages illustrate more than one aspect of human behaviour. A recurrent assemblage of stone tools, never found in any recognizable type of dwelling or grave, nor even associated with broken bones of game indicative of a distinctive selection of menus, should not be termed a culture, but an industry. . . .

When similar associations are found in several different sites, there is a high possibility that these sites were contemporaneous in time. If one of these sites can be dated on an absolute scale, as by the C_{14} method, then all the sites may be placed in the same general place on this absolute scale. Many sites are dated in this way.

As the data from a lot of sites accumulates, a sort of "history of human activity" begins to appear. The man-influenced can be related to the natural by associations. Thus the environment in which a culture existed can usually be determined. A relative chronology may be compiled for a region by cross-dating sites, comparing all the associations and the assemblages found in sites in the region. (Of course, assemblages may be similar without being contemporary.) Pieces of information from the various sites can be fitted together like the pieces of a jigsaw puzzle. Eventually, when the picture is (or will be) complete or nearly complete, cultural histories can be written about the region and the cultures represented in it.

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1. R. Braidwood, "Terminology in Prehistory," Human Origins: Selected Readings, II (Chicago: University of Chicago, 1945). mimeographed.

TYPOLOGY

There may be hundreds and hundreds of artifacts found in a single site. What, then, can the archaeologist do to bring some "system" to all this data?

We bring order to what we encounter each day by giving things names. We call some of our dishes plates and bowls and cups. We recognize that there are a lot of different individual items that we lump together under these categories. For instance, there are large and small, blue and white, plastic and china plates. We would probably consider saucers plates, but we might have some difficulty distinguishing between some plates with high upturned edges and very shallow, broad-based bowls.

So it is with archaeological data. Relationships in the form and structure of different artifacts are analyzed and criteria are set up for different categories. Artifacts are then classified and put into the different categories. Generally items that are similar are considered to be made at about the same time, though this isn't always the case.

The type is the unit of comparison used with artifacts and thus the setup of named categories is called a typology. There may be "designed" or "discovered" types. The former, which are arbitrarily set up, are commonly used in archaeology. In fact, different archaeologists may use different types (different categories) to describe the same assemblage. Thus it is sometimes very difficult to make comparisons of archaeological data.

There have been attempts to discover types statistically. Attributes of artifacts are described, and then the archaeologist seeks to find combinations of artifacts that are found together so often that finding them together is probably not accidental.

There some problems involved in setting up typologies of archaeological data. For instance, much difference should there be between types? How different is different? Also, many archaeologists try to find "ideal" types, things that are made "just right." It is generally true that people have an ideal in mind when they make artifacts, but the ideal in the eyes of the archaeologist may not be the ideal in the eyes of the maker of the artifact. How can we, this many years later, be sure of what was going on in the mind of the maker of the artifact?

How are typologies useful? With typologies, comparisons of artifacts within a site and between sites can be made more easily. Typologies can be used in making chronological scales, and in distinguishing between various strata and various occupations of a site. Being able to describe different kinds or types of artifacts is useful in describing cultures and writing cultural histories.

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8. Listen carefully to the reports which your classmates will give on explaining what can be inferred from different kinds of materials unearthed in archaeological excavations. You will want to take notes on these reports.

9. Your teacher will show you two slides. As you look at each slide be thinking about what the things are that are shown, what they are used for, and what the presence of these things might tell about the culture of the people that possessed them

Slide 1

Slide 2

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10. Your teacher will show you some slides picturing archaeological finds pertaining to the Archaic period in Illinois prehistory. These slides show your data. Take notes as you watch them so that you can make generalizations about the culture of the Indians living at this time. You will also be asked several questions about the slides.

Slide 1.

Slide 2.

Slide 3.

Slide 4.

Slide 5.

Slide 6.

Slide 7.

Using what you have seen in the slides as your data, write in the space below a description, a "cultural reconstruction," of what the culture of the Indians during the Archaic period in Illinois prehistory was probably like.

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11. Your teacher will now show you four slides pertaining to the next period in Illinois prehistory, the Woodland period. Take notes as you watch these slides, paying special attention to any changes which might have occurred in Indian culture between these two time periods. Then answer the questions in your manuals.

Slide 1.

Slide 2.

Slide 3.

Slide 4.

Slide 5.

a. List some of the changes which took place in Indian culture in Illinois between the Archaic and Woodland periods. (Think about how the lives of the people at these two periods in time differed and whether any aspects of culture were introduced in the Woodland period that were not present in the Archaic.)

b. Write a brief culture history of the area during Archaic and Woodland times, including some of these changes and how they probably affected the lives of the Illinois Indians. (If you need more space continue on other side of this page.)

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12. Check your cultural reconstruction and culture history with other data on the Archaic and Woodland periods in Illinois prehistory. Did you make any wrong inferences? If so, why do you think you made them? Correct the cultural construction and culture history in your manual.

13. What kinds of knowledge does an archaeologist need to know?

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THE FOOD PRODUCING REVOLUTION

1. How long do you think it took for man to learn to plant and grow crops and tame animals?

   Why do you think it took this long?

FOOD PRODUCTION

As we begin this section about man's learning to produce his own food, let us review for a few minutes. How did men live before they learned to grow food? How did they provide for their basic needs? Then how did this change as men learned to grow food?

We have seen how the fossils leading up to Homo sapiens have been classified according to their physical characteristics. Cultural characteristics of early man have been used to divide large blocks of time into periods, also. The three periods of time which we shall discuss here are the Paleolithic, the Mesolithic, and the Neolithic. "Paleo" is a prefix derived from Greek which means "old." The Paleolithic lasted from about 500,000 years ago till about 10,000 B.C. The Mesolithic is a "middle" period, a transition period between the Paleolithic and Neolithic. The "Neo" of Neolithic means "new." During the Neolithic Period, which began about 6000 B.C., man was following a new way of living. It must be remembered that the transitions from one period to another did not occur at the same time in all parts of the world. Also, the transitions were very slow.

During the Paleolithic period, which includes all the cultures up to and through the Neanderthal cultures, men lived mostly by hunting and gathering. Thus they moved around in search of food, but only when a new spot would mean less effort in getting the food. The people who had a more stable food source, such as those people who lived where fish were abundant, did not have to move as much.

Sometimes these people of the Paleolithic have been described as "cave men," but we know that this is too simple a term. There were different kinds of men and different cultures, not just one culture. In cold climates, such as in Europe during the glacial times, many men did live in caves and bluff overhangs, but, in general, men of Paleolithic times probably lived in the open. They learned to build shelters. Soon their shelters were shared by nature's opportunists, weeds and insects and small animals, such as mice.

Men learned to use fire quite early, probably many millennia before he could make it. By 25-30,000 years ago, he was making his own fire. Fire not only made meat more tender and palatable, but it enabled man to cook vegetable foods such as roots and seeds, that otherwise would have been difficult to eat. Man also used fire in wood-working and felling trees.

There is a division of labor which is characteristic of hunting and gathering peoples today which was probably also characteristic of Paleolithic man. Thus we can say that the Paleolithic men did the hunting and the women the gathering.

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THE FOOD PRODUCING REVOLUTION

Men searched, often in small groups, for wild game, which they brought back to the "home fire." The meat was then cooked and eaten. Women scraped and prepared the hides for use. Women gathered wild roots, greens, seeds, fruits, nuts, and insect grubs while the men hunted. The women also cared for the small children.

The Paleolithic people used tools made of unpolished stone, bone and ivory. They probably used tools of wood and baskets of grass and perhaps also nets and snares, but few evidences of these have been preserved. Some of the tools used were the basic forms of what we now call the axe, hammer, plane, and knife.

Near the end of the Paleolithic period, men were also burying their dead with weapons and red ochre. Thus, they probably had some belief in an afterlife. They were also drawing animals on cave walls. Perhaps they believed these drawings would help them in hunting or would make game plentiful.

The population during Paleolithic times was probably very small compared to today's population. There were probably not more than 100,000 people on the whole continent of Europe. These people lived in groups of 4 or 5 families. Certainly no more than 200 could have been in a group or there would not have been enough food in the area for all.

Around 10,000 B.C., a climatic change was taking place. The glaciers which had covered much of the Northern hemisphere were melting. It was warmer and wetter. Fishing and water-side hunting and collecting were more important. Waterways were used more for travelling and communicating with other people.

During this time, which has been called the Mesolithic, composite tools (tools composed of several parts) were being used. Pottery was invented, though it was less elaborate pottery than would be used later. Fish poisons were probably used as they are still used in parts of Southeast Asia and the Pacific islands today.

During this period some even more important changes for the course of man's history were taking place, though. There was a revolution taking place in man's methods of getting food. In one Mesolithic site in Southwest Asia, men were using polished sickle flints to harvest barley, wheat, oats, and rye. They also ate onions, cucumbers, pears, almonds, grapes, figs, olives, dates, plants of the beet-cabbage family, and were using flax. There is evidence of cattle, sheep, goats, donkeys, and the dromedary camel. Of course, grain was harvested before it was cultivated by man and animals were eaten before they were raised by man, but it was during the Mesolithic period that man did learn to cultivate grain and raise animals for his own use.

The Neolithic period is considered as beginning when man was dependent on his crops and animals for his basic subsistence. This dependence caused basic changes in man's way of life which we shall consider later.

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THE FOOD PRODUCING REVOLUTION

Cultivation

We have seen that man probably first began to cultivate crops for his own use in the Mesolithic period. "Cultivation" has been defined as "the deliberate sowing or planting of a prescribed area to produce a predictable crop." (Calder, Ritchie. After the Seventh Day. New York: The New American Library, 1961, p. 59) Cultivation is thus consistent with a nomadic life. Groups of people probably planted corn or wheat or yams, etc., and then came back to them at harvest time to gather whatever had been left by insects and field animals.

1. What do you think would be some of the characteristics (including the available resources) of a likely environment for early experiments with cultivation? Why did you choose these characteristics (or resources)?

Domestication

To cultivate crops, men don't have to make many changes in the plants. Our food plants and animals would not be as productive as they are today if man hadn't done more than cultivate them. What he did was to domesticate them.

A professor at the University of Illinois, Dr. Charles A. Reed, is very interested in the problem of the origin of animal domestication. He explains what domestication means to him as follows:

> "domestication to me means simply that the animals are under the control of man to such a degree that, if he wishes, their choice of mates is determined. Artificial selection is thus possible and usually, to some degree at least, inevitable. In a very important sense, then, domestic animals (as well as plants) are a type of human artifact, since they exist in a form changed by man."[1]

1. So, in your own words, what has man done to make his food sources more stable and productive?

2. How do you think this first domestication came about?

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1. Reed, Charles A. "Animal Domestication in the Prehistoric Near East," Science, Vol. 130 (Dec. 1959), p. 1629. Reprinted by permission of Charles A. Reed and the American Association for the Advancement of Science.

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3. Read the following article and compare this account of the first domestication with your account. How is it similar or different?

THE FIRST DOMESTICATION*

The exact stages by which food-production came to be the basis of man's economy are not known, but the process must have been very gradual. Certainly hunting and food-gathering went on side by side with agriculture and stock rearing during the early part of the Neolithic. Perhaps one day a woman noticed that some of the wild seeds she had accidentally dropped a few weeks previously were beginning to sprout outside her hut. As the plants grew bigger she would eat them, and then it might occur to her that what could happen by accident could be made to happen by design. The idea would get around and soon experiments would be made in bringing in seeds to see if they would grow. Thoughtful individuals would study the conditions under which they flourished best, and these ancient agronomists, as we may fairly call them, would eventually discern some of the basic principles of cultivation. At first there would have been many disappointments. Soil exhaustion would often have led to crop failure, and the whole community would have been forced to move on to a new area. But gradually the inquiring agronomists would have found out the cause of the failure, and simple types of irrigation, manuring and crop-rotation would have been introduced. In some such way all the complicated techniques of modern agricultural science must have had their beginnings.

A similar process doubtless occurred with the domestication of animals. A hunter may one day have killed a wild ox accompanied by a calf and brought the young animal back to camp alive. In times of plenty, when there was no need to slaughter it immediately for food, the calf might have become a kind of camp pet. Sheep and goats may likewise have been brought in, or wandered in of their own accord to raid the crops. Gradually it would have been seen that the presence of animals in and near the camp had valuable advantages. They could be placed in pens in times of plenty and kept until the game became scarce. From this it would have been only a step to the deliberate breeding of the captives and the building up of herds.

*Carrington, Richard. A Million Years of Man. (Cleveland, Ohio: The World Publishing Company, 1963.) pp. 166-167. Reprinted by permission of The World Publishing Company.

4. Which do you think came first, plant or animal domestication? Why?

5. Where do you think agriculture began? Refer again to the question about a suitable environment for cultivation. Check your world map. List what you think are the best possibilities below.

Now read the articles "Southwest Asia: The Cradle of Agriculture" and "Southeast Asia: The Cradle of Agriculture."

a. Outline below the arguments for Southwest Asian seed crop agriculture as being first:

Seed Crops First

b. Now outline below the arguments for the root crops of Southeast Asia being first:

Toot Crops First

c. What position do you hold on this question and why?

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SOUTHWEST ASIA: THE CRADLE OF AGRICULTURE

"Nevertheless it does at present appear that the enterprises and discoveries that enabled farming to support the settled village community was achieved only once and within a limited region in the Old World; from there the new knowledge together with seed grain and breeding stock were carried outwards by cultural borrowing and the movement of peoples.

p. 303

". . . both archaeological discovery and recognition of the natural range of wild species of plants and animals ancestral to the cultivated varieties point more and more clearly to south-west Asia."*

p. 306

Man's First Domesticated Plants--Seed Crops?

Many scientists believe that seed crops, crops which propagate themselves by spreading seeds, were the first kind of crop domesticated by man. Some of the major seed crops are wheat, barley, rice, corn, and millet. A great deal of archaeological evidence supports this position.

To date it is believed that the earliest attempts at food production took place in the Near East, perhaps as early as 10,000 B.C. The primary plants domesticated were wheat and barley--seed crops derived from wild grasses native to the region.

What was the chain of events which probably occurred in the domestication of seed crops? Perhaps it was something like this. Men had been obtaining much of their food from hunting but also some of it from gathering wild vegetable foods. As the large herds of animals began to die off with changes in the climate somewhere between 15,000 and 10,000 B.C., gathering became more and more important. People learned the reproductive cycles of the wild grasses and weeds on which they depended. They returned each year to the same stands[1] of wild grass or weeds. Eventually, perhaps, each group of people had several "stands" they called their own.

Most of the plants in a stand of wild grass ripen at about the same time. Then normally the seeds fall off. Harvesting a large stand would be easier and quicker if many people worked at once. Then more of the seeds would not fall off before they could be harvested. With many people working together, there would need to be some kind of leadership or organization so

*From pp. 219, 220 Prehistory by Jacquetta Hawkes (Harper and Row, 1963). This material was contributed by Harper and Row, Publishers, Incorporated solely for use in this project sponsored by the U. S. Office of Education. It may not be reproduced, distributed or sold in another form for any other purpose without the permission of the publisher.

1. Stand--a natural clump of wild grass or a large area grown over by weeds.

people wouldn't get in each other's way. With a large group of people living near such a stand for harvest season, there would be a "semi-permanent village-like settlement." Perhaps the group returned to this settlement each year at harvest time.

Eventually, it is argued, these gatherers learned to scatter seed upon the ground, and to plant. Weeds and men were found together, human beings providing the disturbed soil for the plants to germinate, and the weeds and grasses providing grain for the human diet. In harvesting the stands of weeds, seeds could have been accidentally or intentionally planted. Perhaps two or three thousand years later, people began to notice a new variety--a domesticated cereal grain. As man moved around he could have spread the new variety to different areas, thereby helping it to find a "niche" of its own, safe from excessive competition. Have you ever wondered why someone says that weeds are choking out their garden? The weeds don't need human care; domestic plants do. If the wild plants had been moved from their original home and evolved into a new variety or breed, it is very likely that they would have needed the care and protection of man, also.

Seed and grain-bearing plants have some important characteristics as early cultigens.[1] The seeds and grains are very obviously located above the ground and are thus easier to see and to harvest than some roots. They can also be easily stored and transported. Sometimes grain that has been stored in dry climates for several hundred years will still germinate if it is planted. Surplus grain could thus be accumulated so that it could be used to "tide people over" in bad times or to release some people's labor from agricultural tasks. A third important characteristic of seeds and grains is their high yield per acre. A lot of seeds and grain can be gotten from a relatively small area.

It has been estimated that today in the northern part of the alluvial plain of Mesopotamia a man can support his family on 249 mandays of agricultural labor per family per year. In the New World (Mexico), with corn as the basic crop, a man can support his family on 143 to 161 mandays of labor per family per year. This is quite a difference from the early hunters and gatherers who spent so much of every day searching for food.

The old saying that necessity is the mother of invention does not hold up well with the present evidence about domestication. Domestication evidently came about by "accidents" followed by long periods of experimentation. The first "domesticators" probably did not realize what they were creating. It is also evident that agriculture did not originate from a chronic shortage of food. "People living in the shadow of famine do not have the means or time to undertake the slow and leisurely experimental steps that lead to the development of a better and different food supply."[2] Thus agriculture must have arisen where there was already an ample supply of food.

Wolf, Eric R., "Rise of the Seed Planters" Chapter IV, in Sons of the Shaking Earth, University of Chicago Press, 1959.

Helbaek, Hans, "How Farming Began in the Old World" in Archaeology.

1. cultigens--include both cultivated plants and domesticated animals.
2. Sauer, Carl O. Agricultural Origins and Dispersals. (New York: The American Geographical Society. 1952). Used by permission of The American Geographical Society.

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SOUTHEAST ASIA: THE CRADLE OF AGRICULTURE

"As the cradle of earliest agriculture, I have proposed Southeastern Asia. It meets the requirements of high physical and organic diversity, of mild climate with reversed monsoons giving abundant rainy and dry periods, of many waters inviting to fishing, of location at the hub of the Old World for communication by water or by land. No other area is equally well situated or equally well furnished for the rise of a fishing-farming culture. I shall attempt to show that farming culture in origin is tied to fishing in this area, that the earliest and most literally domestic animals originated here, and that there is the world's major center of planting techniques and of amelioration of plants by vegetative reproduction. I accept the familiar premise that man learned to plant before he grew crops by seeding.*"

AN ALTERNATIVE VIEW: Root crops not seed crops were the first domesticates.

From the foregoing reading one might expect that the very first experiments with agriculture occurred in the general area of the Near East. Many experts hold that man's first agricultural efforts involved the domestication of seed crops such as wheat and barley and that man first harvested the wild grains and then planted and cultivated them. We can guess this took place possibly 10,000 years ago somewhere within the natural habitat of these wild grasses.

However, there is an alternative view proposed by Dr. Carl Sauer, who has done research pertaining to human geography. He has proposed Southeastern Asia as the cradle of earliest agriculture, and he does not believe that the first experiments in planting involved the planting of seeds. He believes that man first planted a root, or a stem cutting, or a piece of a tuber, thereby getting an identical reconstitution of the parent plant. It would be easy, for instance, to pull a potato plant out of the ground, cut off part of the potato, and stick the plant with its little piece of potato back in the ground.

The first "planting" of root crops was probably quite accidental. People probably dug out the roots, ate what they wanted of them, and threw the garbage away. In the garbage dump were enough pieces of the roots that root plants started growing all over the garbage dump. Have you ever planted potato peelings and found later that little potatoes were growing? From this people might have gotten the idea of <u>putting</u> little pieces of root into the ground.

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*Sauer, Carl O. <u>Agricultural Origins and Dispersals</u>. (New York: The American Geographical Society, 1952), pp. 24-25. Reprinted by permission of The American Geographical Society.

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Dr. Sauer does not discredit the findings of early seed planting, but he believes that the planting of root crops came earlier and probably began in Southeastern Asia, which has a mild climate with reversed monsoons giving abundant rainy and dry periods. The area is so situated that fishing may be practiced as a major subsistance way of life. He accepts the familiar idea that man learned to plant before he grew crops by seeding. This idea has a very logical base in that the simple process of cutting part of a parent plant and setting it in the ground is a much simpler process than seed planting (and there is no possibility of mutations or changes that will endanger the life of future plants). The thing grown is an identical reconstitution of the parent plant. As we have seen from our previous readings, the very act of domestication changed and transformed wheat and barley into different types that could not spread themselves without the care of man.

Some of the plants that are grown by root or stem planting are the potato, manioc, banana, and taro (a starchy root of an elephant ear which forms a major food source throughout many Pacific Islands), the breadfruits, citrus fruits, persimmons, certain palms and sugar cane, and the yam. All of these plants are sources of starch, sugar and carbohydrates. Dr. Sauer argues that the people who first grew these crops did not need a balanced vegetarian diet, for they got their fats and proteins from animal food, originally fish and shell fish. He suggests that the fishing culture preceeded the planting culture, and that this type of planting--root crop agriculture--preceeded the planting of seeds.

Root crops, unlike seed crops, do not have to be harvested annually. Manioc or "yucca" can be planted and left in the ground nine months or two years. The tropical agriculturalists plants the cutting and returns to dig up the mature root whenever he needs it. It does not, therefore, require collective effort to harvest root crops or to store them as is the case for seed crops. They are stored in the ground instead of in the grain bin, and, once they are dug up, they cannot be preserved.

Root crop agriculture is common to the tropical areas of the world: Southeast Asia, Tropical Africa, Oceania and the Amazon Basin of South America. The archaeology of tropical forests is very difficult to do. Most of the material culture of ancient jungle peoples disappeared long ago. Tropical peoples use the materials of the jungle such as wood, vines, leaves, gourds, shells and bones for their houses and material objects. Most of these decompose rapidly in the warm, wet environment of the rain forest. If objects of bone, shell or pottery do survive, they are so thoroughly covered and buried by dense vegetation that they are almost impossible to find. These conditions make the investigation of early root crop, tropical forest agriculture extremely difficult. Many archaeologists are becoming increasingly interested in early tropical forest agriculture as the origin of agricultural endeavors. Future archaeological investigations may uncover new and important evidence, disproving the theory of seed crops as the origin of agriculture.

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THE FOOD PRODUCING REVOLUTION

Some new and different ideas about the origins of domestication have been proposed by Carl Sauer. The following are some of his ideas:

1. People who have a hard time finding enough food probably were not the first to domesticate plants and animals. They wouldn't have enough time to experiment with growing crops.

2. Domestication probably began in areas where there was a wide variety of plants and animals to experiment with.

3. Large river valleys requiring knowledge of how to control floods or irrigate crops were probably not the seat of domestication.

4. Agriculture probably originated in wooded lands since it was easier to kill trees than to eliminate tough grasses.

5. Peoples who were most given to hunting probably did not originate agriculture.

6. The first agriculturalists had to live in one place so they could watch their crops and keep animals from eating them.

The progenitors of the earliest agriculturalists I have sought in some well-situated, progressive fishing folk living in a mild climate along fresh waters. Fresh water is postulated rather than salt because seaside vegetation has contributed little and late to the making of crop plants. For sedentary living there must have been available a long season or year-round staple resource in fish and other acquatic life. Clustering of groups in permanent villages was made possible at sites continually advantageous for fishing, such as stream junctions, lake outlets, rapids. Waterways served as lines of communication with other villages and so for the exchange and growth of ideas. Waterfowl, riparian mammals, waterside plants gave diversity to food. Basts and fibers were used to make nets and lines and suitable woods were at hand for boats and paddles.*

*Sauer, Carl O. Agricultural Origins and Dispersals. (New York: The American Geographical Society, 1952), pp. 23-24. Reprinted with permission of the American Geographical Society.

6. Read either of the following two articles (on wheat and corn) and then answer these questions:

   a. Approximately when and probably where was wheat (or corn) first domesticated?

   b. What kinds of evidence have been used to ascertain the origin of domestic wheat (or corn)? List them below:

   c. How has domestication by man changed wheat (or corn)?

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Wheat: The King of Cereals

Wheat covers over 480 million acres of cultivated land in the world, and more than eight trillion bushels of it are produced each year. This is more than any other vegetation cultivated by man. Specialized varieties of wheat are grown from the North Cape to the Equator, from Ireland to Japan, and from nine hundred feet below sea level in the Jordan Valley to more than twelve thousand feet above sea level in the Himalayas. There are 14 species of wheat surviving today. (See the following page for illustrations of different species of wheat.)

Barley is the second most important cereal grown today and its distribution parallels that of wheat. In fact, wheat and barley were probably first domesticated together, quite by accident. Today wild barley still grows as a weed in the wheat fields of southwestern Asia, where the two grasses were first domesticated. In the course of harvesting the wild wheat, early gatherers cut the wild barley, also, thus bringing barley under human domination.

It is axiomatic that domestication of a plant began where that plant was available in the wild state. Botanists look at the distribution of a wild plant today in order to reconstruct its distribution in ancient times. Wild barley is distributed from Turkestan to Morocco, an extremely large region. Wild wheat is found in Asia Minor and Syria, parts of Greece, Palestine, Transjordan and the Zagros Mountains. The search for early evidence of domestication of wheat has centered on the portion of the above mentioned area known as the Fertile Crescent.

The Zagros Range is one of the few remaining areas of the world where wild barley, wheat, millet, and rye still grow. The mountainous region receives from twenty to forty inches of rain annually. Several varieties of nuts, berries, snails and rodents also abound in the mountains and hills. Paleozoologists tell us that the Zagros Range was once the home of wild goats and sheep as well as the wild pig, wild cattle, the onager (a relative of the horse), the wolf, the fox and the deer. This region, therefore, would be a likely spot to look for evidence of very early domestication and settled life.

This is exactly what has been done. Archaeologists have gone to the Zagros Mountains to look for, to dig into, and to study early farming communities. It had long been suspected that the Fertile Crescent would one day prove to be one of the regions of the world where agriculture first began. It was even hypothesized that this area would prove to be the origin of Old World agriculture. But today it is believed that the Food Producing Revolution took place independently in several places at various times. Different environments offered different complexes (groups of species) of plants and man learned first to collect them, then later to plant, and finally to really domesticate them. This process started a chain of changes which revolutionized human life. Man changed from a hunter and gatherer to a farmer and eventually to an urban Chicagoan, a New Yorker, a Londoner, a Parisian or a Muscovite.

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THE FOOD PRODUCING REVOLUTION

Perhaps the earliest attempt at food producing took place in the foothills of the Zagros Mountains in Iraq. The 14 species of modern wheat trace their ancestry to two wild grasses, Einkorn, a small grained wild wheat, and Emmer, a large grained wild wheat.

Barley and wheat are the most adaptable and versatile of cultivated plants. Only these two grasses have been capable of producing forms able to adapt to a wide range of climates, soils and altitudes. The early gatherers, entirely by chance, happened upon the two grasses with probably the highest potential for cultivation. This chance happening, the gathering of wild wheat and barley was perhaps the most fortuitous accident in human history, for the domestication of these two cereals made possible the development of western civilization.

There were some differences among wild wheat and barley plants even before man began cultivating them. The normal wild plants have a very brittle stem that breaks at maturity. The grains are then released and carried by wind and animals, some of them falling on good soil and germinating. Sometimes, however, wild cereals produce a few plants with a recessive tendency to develop a tough stem. These few tough-stemmed plants have lost their ability to disperse.

The early gatherers evidently preferred the tough stemmed plants to the brittle ones. They could harvest more grain from the tough ones simply because, as they harvested brittle ones, the grains fell to the ground and were lost. Eventually only the tough-stemmed plants were selected. This was the actual act of domestication: the tough-stemmed plants could not disperse naturally; they had to be planted by man. All of the domestic species of wheat and barley have a tough stem; consequently, they are completely dependent upon their cultivator for survival.

Later on we are going to study about the earliest known farming-village in the Old World. Domestication of wheat and barley was far advanced by the time the village was established in 7000 B.C. The wild wheats and the early domesticated variety of wheat found at Jarmo are of a type that have a hard husk that cannot be removed merely by threshing. The people of Jarmo had to parch these wheats and the heating made the husks easy to rub off, allowing the kernels to be more readily chewed or ground into meal. The kernels found are carbonized as if they had been over parched. So our archaeological evidence for the domestication of wheat depends upon kernels of wheat that the housewives of Jarmo overheated or burned! After the kernels of wheat were parched and ground, the grains were soaked and a gruel or porridge was made. One might call this the earliest ancestor of cream of wheat. If the gruel was allowed to stand in a warm dwelling for a few days, it could have become infected with wild yeast, and, if a little sugar was added to this, a mild alcoholic drink similar to beer resulted.

Also, if industrious housewives noticed that if they left the gruel for a few days and then baked it, the result was a bread much lighter and not as tough as the original loaves or cakes of unleavened bread. Possibly this is how the art of breadmaking began.

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FOURTEEN SPECIES OF WHEAT are shown actual size. From left to right they are *Triticum aegilopoides* (wild einkorn), *T. monococcum* (einkorn), *T. dicoccoides* (wild emmer), *T. dicoccum* (emmer), *T. durum* (macaroni wheat), *T. persicum* (Persian wheat), *T. turgidum* (rivet wheat), *T. polonicum* (Polish wheat), *T.*

From: Mangelsdorf, Paul C. "Wheat," Scientific American, Vol.189 (July 1953), pp. 52-53. Reprinted by permission. Copyright © 1953 by Scientific American, Inc. All rights reserved.

timopheevi (which has no common name), *T. aestivum* (common wheat), *T. sphaerococcum* (shot wheat), *T. compactum* (club wheat), *T. spelta* (spelt) and *T. macha* (macha wheat). The first two species have 7 chromosomes; the following seven, 14 chromosomes; the last five, 21 chromosomes (*see table on next two pages*).

FEEDER OF MEN: CORN

The Growth of New World Agriculture

Wheat, barley, rye, millet and rice are the important seed crops domesticated in the Old World which made possible the rise of large populations and complex civilizations. In the New World, however, American Indian civilizations were dependent upon another crop to fill the empty stomachs of the growing numbers of farmers, laborers, priests, administrators, and merchants who carried out their daily tasks in the cities and villages of ancient America. This famous plant was corn, still the staple of Latin America and an important supplement on the dinner table in the United States.

Our idea of corn as a huge yellow ear, boiled or roasted and smothered in butter, is far from its original role. In the United States, much corn is picked green while the kernels are still tender and juicy and is then prepared as a vegetable. Traditionally, however, most corn is left to ripen until the kernels are hard and dry and can be ground into corn meal--a flour which has still not completely disappeared in parts of the United States, as corn bread will testify.

Corn, like the Old World cereals, is a grass. Since there is no satisfactory evidence that corn existed in the Old World before Columbus' memorable voyage, our research for its origin need not go beyond North and South America.

As you remember, the earliest men in the Americas were hunters of great animals and trappers of smaller game, and though they undoubtedly consumed much plant food, they knew nothing of agriculture. Wild roots, seeds and berries were collected by the early hunters, but they did not intentionally plant seeds in the soil to grow plants. It is likely that the hunters, who constantly followed herds of game animals, were never in one place long enough to become familiar with the reproductive cycle of plants. Or, perhaps, a migratory group of hunters could not be bothered with the investment of time necessary to plant because they had to follow the herds and might not be nearby to protect the fields or harvest the yield.

At the end of the ice age, climates became warmer and drier. This climate change, combined with the intensive hunting practices of man, apparently caused the extinction of some animals and a great reduction of most other game. Out of necessity, man became increasingly dependent on the collection of plant foods along with hunting, trapping and fishing.

By the seventh millennium B.C., small groups of men and women were eking out a meager existence in various regions of the Americas. Their continued success depended on intensive exploitation of the local resources combined with growing knowledge of the environment. Operating in a small area, the increased familiarity with plant production and regenerative cycles probably prepared man for the monumental step from food gathering to food production.

Where was corn first planted? Was it in South America or North America? By the time Columbus arrived, corn could be found from the St. Lawrence River in North America to Northern Chile in South America, and it supported great civilizations in both continents.

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THE FOOD PRODUCING REVOLUTION
Feeder of Men: Corn

Corn is now such a completely domestic plant that it is dependent on man for continued survival. The seeds, or kernels, are firmly attached to the cob and covered by a tough husk,making it impossible for the seeds to fall to the earth naturally. Botanists realized that early, wild corn would have had to be very different from domestic corn and they began to search for living wild ancestors of present day varieties. It was also felt that wherever wild species grow would be a likely place for domestication to have taken place thousands of years ago. But, after many years of searching, no wild corn could be found. Many botanists concluded that the Central Andes Mountains of South America must have been the point of origin of corn due to the vast numbers of varieties found there. It was believed that the nuclear zone of corn agriculture should have the greatest number of modern varieties. The longer period of time of primitive corn in the nuclear area would have allowed for more evolutionary development.

More recently however, fossil pollen grains have been found in drill cores from the sediments of Central Mexico. They are considered to be over 50,000 years old, which points to Mexico as the home of wild corn and possibly the first domestic corn. Archaeologists, following this lead, began a series of excavations in dry areas, and especially caves, where ancient plant remains would be preserved. After many seasons of work in Mexico, a tenacious archaeologist, Richard MacNeish, and a corn genetics expert, Paul Mangelsdorf, pieced together a complete sequence. In Central Mexico, only 150 miles southeast of Mexico City, they could demonstrate the evolution of culture from hunters and gatherers through early farmers to city builders. Corresponding with this was the evolution of corn from a wild grass of low productivity into the modern varieties of Mexican corn.

The earliest people of Dr. MacNeish's sequence were crude hunters and gatherers who constantly wandered about in search of food. They used chipped stone projectile points, knives and scrapers and knew no agriculture. By about 7000 B.C., however, these tiny bands of men were becoming increasingly dependent on collections of plant foods. Possibly by 5000 B.C., one plant was already being cultivated, the squash. Tools of the period include grinding stones, to grind seeds and roots, as well as crude choppers, which may have been digging implements. Wild corn was probably one of the many sources of food collected during the yearly cycle of migration.

These hunters and gatherers probably shared a common tradition with the early desert cultures of northern Mexico and the western United States. In the "Grest Basin" and southern California, similar cultures survived until the arrival of missionaries and frontiersmen. They were found to practice occasionally the crudest form of agriculture--casting seeds upon the ground or channeling river floods over natural grasslands. Plants were not tended and most of the daily meals came from wild sources, as was also the case in ancient central Mexico.

After 5000 B.C., the incipient farmers began to experiment with new plants, including corn. Corn was then of low value with a cob less than an inch long, and it could hardly have fed many people. Thus, for some 2000 years, family groups must have returned periodically to natural stands of wild vegetation to plant and tend and eventually harvest what was not more than 10% of their dietary need. None the less, the foundations of modern

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agriculture were being laid. Added to cultivated corn and squash were varieties of beans, chili peppers, gourds and other plants. Population was slowly increasing, too, and we might infer that religious specialization was developing as well. A vast area was probably participating in this slow change to exploitation of domestic plants. Archaeological remains from southern Mexico to the border with the United States show that corn was slowly spreading. Other areas had different domestic plants, too, and there was probably a lot of exchange.

It was not until after 3000 B.C. that there was any hint of village life in Mexico. By that time, however, corn had undergone considerable changes and was much larger, though still primitive by modern standards. Dogs were kept and cotton was grown. Stone bowls and baskets were manufactured. The early farmers were still dependent on wild plant resources, however. Agriculture did not supply more than 30% of the nutritional need of the still small population.

In far off Peru, we have abundant evidence for a similar development. Agricultural villages of a primitive nature appeared on the coast of Peru by 2500 or 3000 B.C. Corn was not included in the crop inventory of early Peruvian agriculturalists and dependence was on other crops, especially certain South American roots as well as beans, squash, and gourds.

Still another thousand years elapsed before a considerable number of people were living in villages and getting most of their food from farming. At about this time, in both Peru and Mexico, pottery made an appearance and ceremonial structures were first erected.

In such a manner the transition from food gathering to food production brought about a new way of life in the New World.

It was hardly a revolution fought with violence or growing pains, but rather a slow and gradual transition over 40 centuries. A cycle was initiated in which man became more dependent on plants and consciously or unconsciously selected better seed for planting. Eventually plants improved; new varieties evolved which better satisfied the needs of the human planter. Careful tending by the hands of sedentary farmers yielded greater productivity. Some 4000 generations of corn and almost 150 generations of men were necessary for the most important of all revolutions, the food producing revolution.

No person and no area in the New World can be given full credit for having produced the agricultural revolution. We can only say that in Mexico we know the transition from man the hunter to man the farmer to man the "civilized" better than in any other place in the world. That a wide area was participating in the agricultural revolution is particularly evident in Peru, where an apparently independent tradition of agriculture had existed at least 1500 years before the appearance of Mexican corn (about 1000 B.C.).

What was happening in between Peru and Mexico is difficult to say. Wet, tropical conditions have made it impossible to recover early plant remains, but archaeological sites with well made pottery are known from Ecuador and Colombia 1000 years before pottery appeared in either Peru

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or Mexico. Whether early Indians there were farmers or simply hunters and gatherers exploiting the rich sea shore environment remains to be discovered. Whichever they were, corn did diffuse from Mexico to Peru, and manioc (yucca) and some Peruvian species of beans reached Mexico in return.

The vast complexity and quantity of varieties of corn in Peru can probably be accounted for by modern genetics. Rather than expressing the length of time of isolation in the Andes, the varieties of corn are the result of enforced isolation in small valleys and rapid mutation. It is known that in high altitudes, such as in the valleys in the Andes, intense solar and cosmic radiation generates mutations more rapidly than in lower zones.

Several varieties of distinctly Andean corn were eventually introduced back into Mexico, causing the initial confusion in corn classification and research.

In Mexico, where the climate was dry but water sources sufficient, primitive farmers could advance into new areas without excessive clearing. Rivers and lakes afforded water for irrigation, and a varied environment supplied a spectrum of plants and stimulated trade of goods and ideas. Varieties of corn suited to various climates were developed, and the total productive capacity increased. On this economic basis, one of the great civilizations of the world arose.

Peru underwent a similar process, combining corn with important home crops such as potatoes and manioc (yucca). With such versatile staples the Andean Indians exploited the dry coast, the high mountain valleys, and the wet tropical forest, accumulating one of the most impressive collections of domestic plants in the world.

Domestic animals played a very minor role in the New World. The dog was perhaps brought with early hunters from Asia or perhaps domesticated independently in the Americas. Several varieties existed before the introduction of European dogs, but perhaps most famous is the fat little Mexican dog, the chihuahua, which was raised for food. The meat animal of the Andes was the locally domesticated guinea pig. Aside from these, ducks, turkeys, and bees were domesticated in various parts of the American continents. In the Central Andes the llama and alpaca, American relatives of the camel, were also brought under domestication. Though both, and particularly the llama, were slaughtered and eaten, they were kept primarily for other purposes. The llama is a pack animal, carrying up to 80 lbs. However, it walks faster than the horse or donkey and is very sure footed as well as resistant to high altitudes and cold. Alpacas are fine wool producing animals. Their wool is used for making the warm clothes that the highland Indians need to survive. Though little information is available, llamas and alpacas have probably been herded since 1000 B.C. or earlier. In contrast to New World plants, it appears their first use was not strictly functional but perhaps sacrificial.

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THREE NEW WORLD GRASSES are involved in the history of domesticated corn. Wild corn (reconstruction at left) was a pod-pop variety in which the male efflorescence grew from the end of the cob. Teosinte (center) and Tripsacum (right) are corn relatives that readily hybridized with wild and cultivated corn. Modern corn came from such crosses.

From: MacNeish, Richard S. "The Origins of New World Civilization." Scientific American, Vol. 211 (Nov. 1964), p. 35. Reprinted with permission. Copyright © 1964 by Scientific American, Inc. All rights reserved.

THE FOOD PRODUCING REVOLUTION

7. Read the following article and then answer these questions:

   a. Approximately when and probably where was the dog first domesticated?

   b. What kinds of evidence have been used to ascertain the origin of the domestic dog? List them below.

   c. How has domestication by man changed dogs?

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DOMESTICATION OF THE DOG

Domestication in its simplest terms means "tamed." In our search for the ancestor of the dog, we are asking what animal (or animals) which became the dog was first tamed by man, thereby becoming a domesticate. The suggestion has been made that the domestic dog was derived from a wild dog that is now extinct. This has been rejected by scholars, though, because no fossil evidence of such an extinct dog has been found. Thus we will operate under the basic assumption that this animal which became the domestic dog was one of the living wild members of the same genus, Canis, since, through evidence from early archaeological sites and paleozoological* studies, it has been determined that wolves, coyotes, jackals and foxes have been present in essentially modern forms for over half a million years. Therefore, the comparison of canid remains dating from 50,000 years ago with bones of modern canids is valid.

Thus, the early ancestor of the dog was probably one or more of the following members of the genus Canis: the wolf, the coyote, the jackal, the wild pariah dog, or the wild Australian dingo dog. It is assumed that the dog was first domesticated somewhere within the geographical distribution of these living wild members of the genus Canis. Figure 2.1 is a map of their distribution.

There is fossil evidence which supports the wolf as the ancestor of the dog and which would place the domestication of the dog as very early, indeed. On the basis of careful analysis of bones of wolves and fossil remains of canids from early sites in Denmark called Magelmosian sites, (6500-8000 B.C.), it has been concluded that the Maglemosian dogs of northwestern Europe were wolf-derived. In the opinion of Dr. Charles A. Reed, a paleozoologist, the earliest valid specimens of the domestic dog in the Near East are from one of the lower levels of Jericho (6500 B.C.). The limited sample shows considerable size variation, indicating at least two breeds. On the basis of dental similarities, it has been concluded that the dogs of Jericho are also wolf-derived.

Unfortunately, northwestern Europe and the Near East are the only two areas that have been carefully studied. One cannot rule out the possibility that the dog was domesticated many times in several places. The fossil evidence is overwhelmingly in favor of the wolf as the ancestor of the dog, but this may be due to the bias of archaeological investigations in the domain of the wolf.

There is also cultural evidence for dogs having been around a long time. At Jarmo, an early farming village in Iraqi Kurdistan which dates about 7000 B.C., the best evidence so far for dogs is cultural in nature. Small figurines of very doglike animals with upcurled tails have been uncovered. The domestic dog is the only member of the genus that has a curled tail. Otherwise, the figurines could have been of wolves or foxes. The biological evidence would be misleading without the cultural evidence because the bones of the canids found in Jarmo are

*The comparison and study of bones is called osteology, but when it deals with ancient animal bones, it is called paleozoology (the study of ancient animal life). This field of research is essential for the investigation of domestication of animals, for it is only through careful analysis and comparison of bone remains that one can determine what these early animals were. For instance, if an archaeologist finds the remains of what he thinks is a dog, he may thus call in a paleozoologist to determine whether these are the remains of a dog, a wolf or a jackal.

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either of foxes or wolves. It has been presumed that wolves and foxes made up part of the diet of the people of Jarmo and this is why their remains are found in the habitation debris. Dogs were evidently not eaten and were disposed of elsewhere? Or were they held in such loathing that their carcasses were not allowed to lie in the village dump? We can never know. It must be pointed out that, with many of the archaeological remains, it is very difficult to distinguish between small wolves, large dogs, and foxes.

One of the few long range behavioral studies of dog breeds is found in John Scott and Paul Fuller's book, Genetic and Social Behavior of the Dog, published in 1965 by the University of Chicago Press. This study is the result of five years of research. The authors support the hypothesis that the wolf was the ancestor of the dog. The comparison of various types of behaviors of the dog, wolf, jackal, fox and coyote show that the wolf and the dog share common behaviors. All of the canids are pack animals; they prefer social living to solitary living. They are hunters and scavengers.

The great variety that is found among the various dog breeds is not found among the wild members of the genus. The hereditary composition of any wild species tends to reach a condition of balance. Traits that do not enable the animal to operate effectively in this environment are lost over time. Ineffective animals simply fail to reproduce. For instance, if a wolf was born with the mutated stumpy legs of a dachshund, he would not reach maturity because he could not catch his prey. The mutation would not be passed on and the characteristic would die out.

Over the centuries, however, man has learned to control the characteristics of his domesticated animals with increasing efficiency. Thus genetic selection was evolved without man's really understanding what biological force was being used--only that it worked. Man bred dogs for gentleness or speed or fierceness. Some breeds of dogs are used just for hunting, whereas other breeds have lost either the acute sight or sense of smell that are valued in the hunting breeds. The Pre-Hispanic Mexicans bred dogs as food animals (the ancestor of the Chihuahua). They were considered a great delicacy.

Sometimes, then, animals which would not be able to survive in the wild stayed alive and bred because man took care of them. For instance, if a desirable "champion purebred" is sickly, he is fed, protected and bred. He will probably pass his sickliness on to his offspring. Man thereby has unwittingly created a physically weak breed. An example of this is the English setter, who commonly has hereditary hemophilia or bleeders disease but is prized as a hunting dog.

Wolves and dogs share the same basic behavior patterns (hunting, scavenging, pack living, etc.). Over the millenia, however, selection for particular traits has modified some of these behaviors in dogs. For instance, the bird dog breeds are unusually peaceable animals; they have been selected for a "soft mouth" so that birds will not be damaged when carried back to the hunters. For the old English sport of bullbaiting, a dog was needed that would attack a grown bull. The bulldog breed was selected for a tendency to attack the muzzle of the bull and hang on instead of attacking from the rear as most dogs and wolves do. Hence the breed has been named the bulldog.

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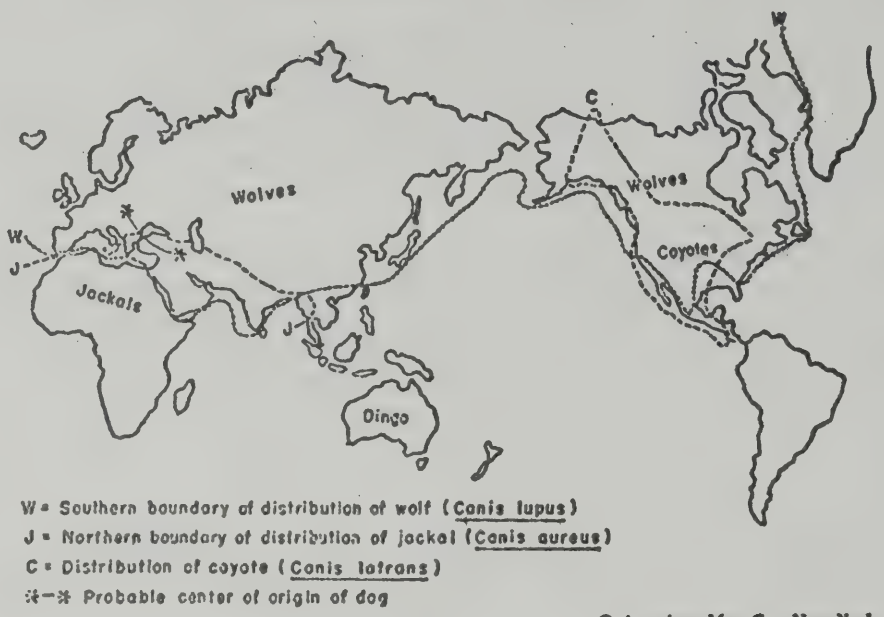

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FIG. 2.1.*—Geographical distribution of wild members of the genus *Canis*. Wolves are northern animals of Eurasia and North America, whereas jackals belong in Africa and southern Asia and coyotes are confined to North America. The earliest known remains of dogs (in Denmark) fall within the range of the wolf. (Modified from Werth, 1944)

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FIG. 2.2.*—Centers of domestication and hypothetical adaptive radiation of dogs from these centers. Solid lines represent the northern dogs, and broken lines the southern dogs, including the basenji and dingo.

*Scott, John Paul and John L. Fuller. Genetics and the Social Behavior of the Dog. (Chicago: University of Chicago Press, 1965). Copyright © 1965, University of Chicago. Used by permission of University of Chicago Press, publisher, and the American Map Company, Inc.

We could consider every breed for its particular characteristics, but one last illustration will serve to demonstrate how certain behaviors of various breeds of dogs are related to their physical structure and how these characteristics have been retained and valued. The scent hounds are unusually peaceful animals which rarely get into serious fights. The hounds also have long, baggy lips which could easily be bitten by the hound himself in the course of a fight. These baggy lips, though, probably help him to "taste" the scent he is following.

Probably the dog breed that still most closely resembles its ancestor is the Eskimo sled dog. These dogs are often bred with wolves to maintain their strength and fierceness. The Eskimo dog runs in a pack; he would hunt and kill if allowed to and he fights with the other members of his pack when fed. In short, this breed displays many more behavior systems resembling those of the wolf than other "more domesticated" breeds such as a tiny toy poodle. The toy poodle has been changed over the millennia by the capricious whims of his master, man.

Now that we know that man, through selective breeding, is responsible for the great variety of dogs, we can speculate how this first came about.

There have been recent instances of wolves that were tamed and kept as pets. One such case is told in a Saturday Evening Post story "The Wolves in our Tent" (No. 228, 1956, pp. 34-36, 90-92). The story is about Mr. and Mrs. Crisler, who spent several months in northern Alaska working on films of caribou. They adopted wolf pups and kept them as pets. They state that the wolves were just as affectionate as any domestic dog. As long as the tamed wolves were well fed, they did not hunt or kill other animals.

It is not hard to imagine an early hunter and gatherer finding and keeping a wolf pup 10,000 years ago. The pup probably learned to follow the hunters and take advantage of the remains of a kill. It is even easier to imagine that eventually someone discovered the "tamed wolves" sensitivity to strangers, animals or humans, who were approaching, and so the "tamed wolves" came to be valued as watchdogs.

In the beginning, there must have been some confusion between tame wolves and wild ones, but very early a mutation occurred giving the tamed variety, of all things, a curly tail. Wild and domestic wolves could then be easily distinguished. Also, very early, there probably occurred selection for animals that could be easily controlled. This meant the development of small or medium sized wolves with smaller and less dangerous teeth.

The "new wolf" could have moved into new geographical areas not inhabited by wolves, jackals or coyotes. These "new wolves" would then adapt to the new and different environments, possibly changing somewhat physically in doing so. This is called adaptive radiation. Thus whole new populations or breeds may have come about from a few variable dogs. The new, changed populations of dogs did not have to compete with the wild members of the species and therefore their physical variation from wolves was passed on to future generations.

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It is quite possible that each early farming village had a small population of dogs somewhat different from those of other villages. Constant inbreeding and the tendency of human beings to select and breed those animals they especially valued for some characteristic gave rise to different kinds of dogs. The history of modern European dogs shows that many breeds were purposefully produced. In Egypt there is evidence (a bowl with recognizable pictures of greyhounds) that greyhounds were bred as early as 3500 B.C.

One of the desired transformations from a wolf to a dog would be a reduction of wildness. If a wolf puppy is taken from its parents before its eyes are open and is adopted into a human society, it will develop very much like a domestic dog. The older the wolf cub gets before it is taken away from its parents, however, the harder it is to domesticate it. It develops fear reactions and fighting behavior very early in its natural habitat. An older cub bites and fights in frantic fear when caught. An adult wolf can be tamed eventually, but it is a long and delicate process.

In conclusion, it is most likely that domestic dogs came about as a result of early man taming a wolf cub 10,000 years ago. During this long, continuous, and close association between man and dogs, the various breeds of dogs have developed. The modern breeds of dogs are, therefore, artifacts of human societies. They are products of selective and controlled breeding.

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1. Looking around us today, we see enormous buildings filled with people busy at a wide variety of tasks. We know that there exist cities containing millions of people. We can eat fruit or vegetables that were growing two thousand miles away the day before. We can talk to people on the other side of the globe and we can send rockets to the moon.

All in all, we live in a pretty complex culture. How did all this complexity come about?

We have seen that early man hunted and gathered his food. He made tools that were very simple by our standards. His communication extended only to members of his band or to persons in several other bands. He often ranged widely over a given territory, but he could go no farther or faster than his legs would take him.

Then came the Food Producing Revolution. Man had learned how to domesticate plants and animals. It became easier for him to get the food he needed. He didn't have to travel around so much. With some time released from the search for food, man could develop better tools and shelters. He could think about religion and art and he could progress.

What happened between the beginnings of the Food Producing Revolution and our complex culture today? How did man develop civilization? The remainder of the work this semester may shed some light on answers to these questions.

QUESTIONS ON THE LOCI OF THE WORLD'S OLDEST CIVILIZATIONS:

a. We have positive archaeological proof of six centers of civilizational development. Where are they?

(1)
(2)
(3)
(4)
(5)
(6)

b. Are there any generalizations that you can make about where they are located?

c. Name the three areas that have been postulated as centers but about which we do not have sufficient archaeological evidence to prove or disprove them as centers of civilizational development.

(1)
(2)
(3)

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d. The arrows indicate diffusion of cultural traits or at least some influence. Which centers appear to have developed independently? Which didn't?

e. What is the time difference between the emergence of the civilizational level in Mesopotamia and Northern China? What is the time difference between the same point in Mesopotamia and Northern China?

f. Are there any other observations that you can make regarding these early civilizations?

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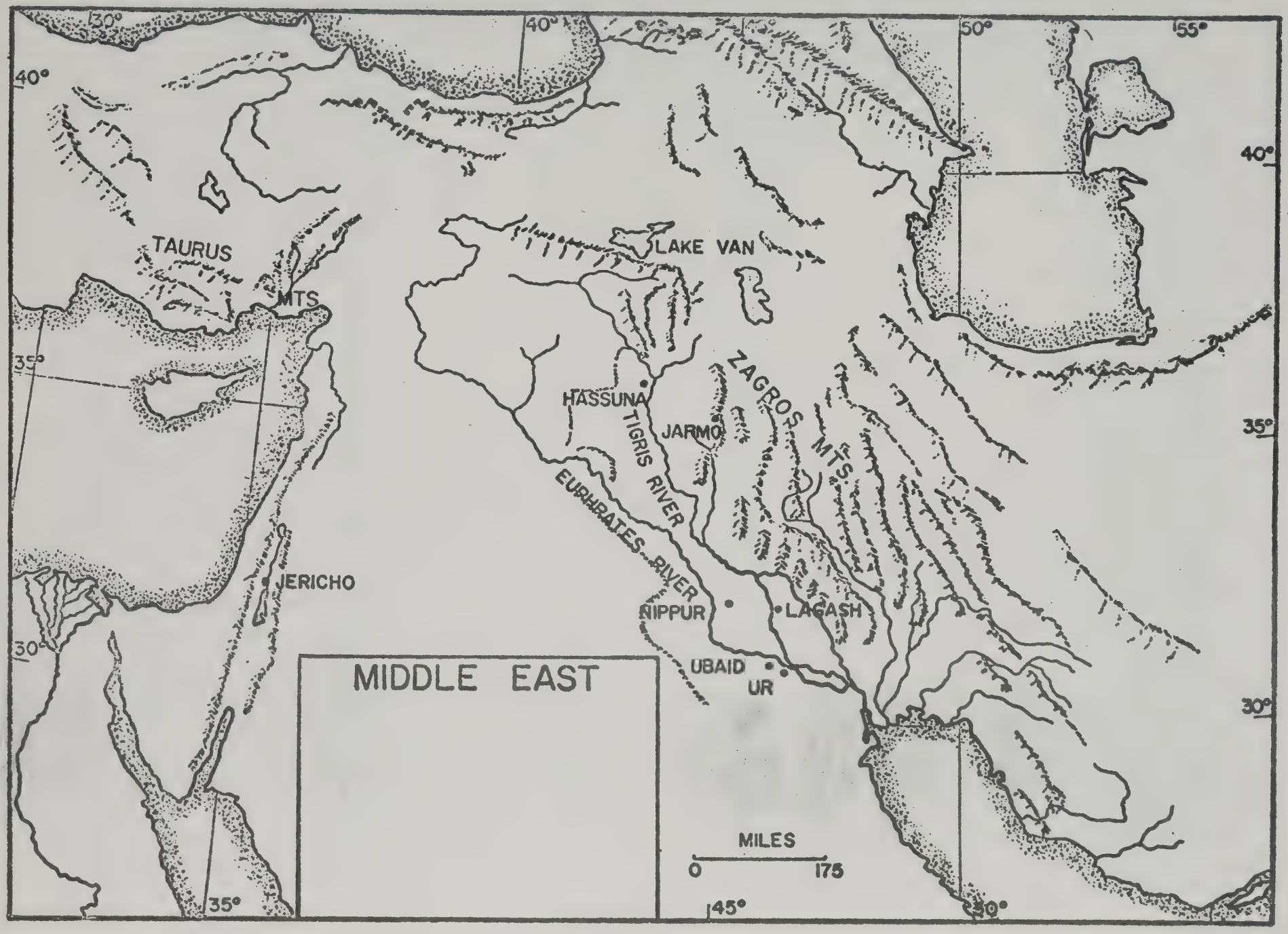
MIDDLE EAST
TAURUS
MTS
LAKE VAN
HASSUNA
JARMO
TIGRIS RIVER
EUPHRATES RIVER
ZAGROS MTS.
JERICHO
NIPPUR
LAGASH
UBAID
UR
MILES
0
175
130°
40°
50°
55°
35°
30°
45°

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2. Your teacher will show you a series of transparencies concerning the geography of an area of the world where the earliest known civilization arose. From your studies in geography, what can you determine about the physical environment of this part of the world? Consider one aspect of the physical environment at a time. In the space below, record your ideas and observations as well as important points brought out in class discussion.

a. Landforms

b. Drainage

Using the reading, "Regime of the Tigris and Euphrates," as a source, state below the major characteristics of the two rivers. What do they have in common? How are they different?

Euphrates	Tigris

c. Climate

Name the three predominant climatic zones of Mesopotamia shown in the transparency.

_____

_____

_____

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Land of the Tigris and Euphrates

What is the land of ancient Mesopotamia really like?

". . . if you visited this land today, you would find it hard to believe that it was here. . . that human beings first learned to live a life which you would recognize to be remotely like our own. It is a hot, desolate land, hilly toward the north, but in the main a flat expanse of alluvial mud brought down by the two great rivers, the Tigris and Euphrates."[1]

"The Tigris and Euphrates are not like the Nile; they may rise unpredictably and fitfully, breaking man's dykes and submerging his crops. There are scorching winds which smother man in dust, threaten to suffocate him; there are torrential rains which turn all firm ground into a sea of mud and rob man of his freedom of movement; all travel bogs down. Here, in Mesopotamia, Nature stays not her hand; in her full might she cuts across and overrides man's will, makes him feel to the full how slightly he matters."[2]

In size, Mesopotamia is somewhat smaller than California. To the north and east of it are the mountains of Turkey and Iran. To the south of it is the shallow Persian Gulf. The southern part of this area is a hot alluvial plain. Much of these Mesopotamian lowlands is covered with marshland and braided river drainage. North of Baghdad is fertile plateau with more moderate temperatures and some rainfall.

Two rivers dominate the area. These are the Tigris and Euphrates. Both rivers cut around folds of the Anatolian Mountain system, where they are fed by melt-water. Then they cross the plateau uplands of northern Syria and Kurdistan and continue on a general southeast course across the hot plains of Iraq. Both rivers follow a fairly steep slope toward the sea. In some parts of the rivers the current is too swift for unpowered boats to go upstream. Both rivers also carry a great deal of sediment. They are at their lowest in September and October and rise from December on.

The Tigris is narrower than the Euphrates and it carries more water. It is closer to the Zagros Mountains and there are more streams emptying into it than into the Euphrates. Both rivers are subject to floods, but those of the Tigris are generally more sudden and more extensive because the surface run-off from mountain torrents flows into the Tigris. The Euphrates referred to in the Bible as "the great river, the river Euphrates," has two tributaries in the uplands, but none from the Syrian and Arabian deserts. There are empty watercourses which indicate that in the past there were more streams flowing into both the Tigris and Euphrates. Also, in former times, the two rivers probably once followed entirely separate courses and had different mouths on the Persian Gulf. Then the shore line of the Gulf was much closer to Baghdad.

1: Cottrell, Leonard. Land of the Two Rivers (Cleveland: The World Publishing Company, 1962), p. 10. Reprinted by permission of The World Publishing Company.

2: Frankfort, H., et al. Before Philosophy (Baltimore: Penguin Books, 1959), pp. 138-39. Reprinted by permission of Penguin Books, Ltd.

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"Little is known of the climate of this early period, but the presence of denser forests and more open parkland, now reduced by deforestation and overgrazing, implies a slightly higher rainfall. Otherwise the Near East ten thousand years ago is said to have had the same physical aspects as it bears today. Against this background then, so utterly different from that of Europe at the same time, the momentous developments about to take place--the discovery of agriculture and animal domestication--the very foundation of civilization--must now be viewed in the light of the evidence."[1]

Study the reading "Climate" about the climate of the lowland region. Describe below how you think you would feel in a Mesopotamian summer. How about in the winter?

When does rainfall occur? What is the annual range in the lowlands?

In contrast, what is the precipitation over the Zagros Range?

Where in Mesopotamia would you expect to find the earliest farming villages? Why?

d. Vegetation

List the types of vegetation found in the region.

_____

_____

_____

e. Soils

What are the 3 types of soils found in Mesopotamia?

_____ _____ _____

---

1. From EARLIEST CIVILIZATION OF THE NEAR EAST by James Mellaart. Copyright © 1965 by Thames & Hudson Limited. Used by permission of McGraw-Hill Book Company.

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What implications do the soils of this region have for agriculture?

HOW SUITABLE DO YOU THINK THIS REGION WAS FOR THE RISE OF CIVILIZATION?

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II. CLIMATE[1]

The lowland region has two marked seasons--a dry and intensely hot summer, lasting from May to October; and a relatively cold, damp winter from December to March, with spring and autumn as short transition periods between the two.

With the development of summer monsoonal low pressure conditions over the Persian Gulf and north-west India, air is drawn towards the south-west, giving remarkably regular and constant north-westerly winds over the whole of Iraq. These are known as Shamal, and blow without interruption during the summer. The air is dry; no cloud forms, and the sun beats down uninterruptedly over the lowland, giving rise to shade temperatures that exceed 9[illegible]°F. on most days, and not infrequently reach 120°F. Some relief is obtained during the night, as diurnal variation of temperature is marked: and near the rivers and marshes, intense evaporation may lower the day temperature by a few degrees. Lacking the possibility of moving to nearby hill regions, most Iraqis are driven to constructing underground shelters (sirdab) in which to pass the hottest part of the day. A further unpleasant feature is blowing dust, raised by the strong Shamal, which reaches a climax in late afternoon, and drops at night.

With the wind blowing towards the Persian Gulf during the summer season, there is little mitigating effect from the presence of the sea--temperatures for Basra, Baghdad, and Mosul show a remarkable uniformity, though it may be noted that nights are cooler inland, and the length of the summer is somewhat shorter in the north. . .

In winter, temperatures generally lower than might be expected can be explained by the presence of snow-covered mountains to the east and north. Differences are apparent between the north or upper basin, and the south; the former region experiencing something approaching a continental regime, the latter a milder climate, due to latitude and the influence of the sea. A comparison between Mosul and Basra[2] shows that for the coldest month (January) there is 8°F. difference of temperature. . .

Because of the predominating off-shore wind, the high air humidities characteristic of the Persian Gulf do not occur on such a wide scale in the Euphrates-Tigris region. Nevertheless, as we have seen, evaporation close to rivers and lakes is high, and the air over a short distance becomes very humid. . . This fact, which does not always appear in climatological records, is responsible for a difficult 'physiological' climate, in which heat stroke and exhaustion can easily occur; and this goes far to explain the notorious reputation of southern Iraq--a reputation which does not at first sight seem justified until one takes into account the local variation of humidity.

---

1. Fisher, W. B. The Middle East (New York: E. P. Dutton and Company, 1961 pp. 368-71. Abridged from the book The Middle East by W. B. Fisher. Published by E. P. Dutton and Company, Inc., and reprinted with their permission.
2. Consult the map in your manual. Barsa is a modern city located near the ancient site of the city of Ur (2000 B.C.). Mosul is the modern town not far from the site of Hassuna which was a farming village (5800 B.C.).

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Rainfall occurs only during winter, and is almost entirely due to the arrival of moist maritime air from the Mediterranean, in the form of shallow and somewhat degenerate depressions [low pressure areas]. The damp air has previously passed over the mountainous country of Anatolia or the Levant, there depositing much of its moisture, so that on arrival in the Tigris-Euphrates basin, only a reduced rainfall occurs, with annual totals ranging in the lowlands from 1 to 20 inches. On uplift over the Zagros ranges, however, considerable precipitation, exceeding 40 inches, occurs--a figure rather higher than at one time believed--and, in order to explain this apparent anomaly of abundant rainfall from weakened and dried-out depressions, it is necessary to recall that all rainfall in Iraq is of the instability type [convection lifting]. . ., and is therefore intensified by a mountainous topography. There may also be a further factor: rejuvenation of the depressions by absorption of water vapour from the bast tracts of swamp and lake in lower Mesopotamia, or, more distantly, from the waters of the Persian Gulf. . .

Because of the regularity of land forms, the distribution of rainfall follows a simple pattern. Late January or early February is the wettest period, and normally no rain falls between the end of May and the end of September. Over most of the country annual falls do not exceed 5 inches, but towards the mountains on the east and north there is a rapid increase. The foothills of the Zagros stand out as relatively well-watered, and the Assyrian region receives over 15 inches, an amount sufficient to allow cultivation without irrigation. The 15-inch isohyet[1] is of extreme importance in Iraq and northern Syria, since it marks the effective limit between desert and cultivated land (Fig. 65). With less than 15 inches annual rainfall agriculture is dependent on irrigation, and settlement is confined to the neighbourhood of rivers--away from water supplies, the population is nomadic.

[1] Isohyet - a line drawn on a map connecting points having equal rainfall for a certain time or for a stated period.

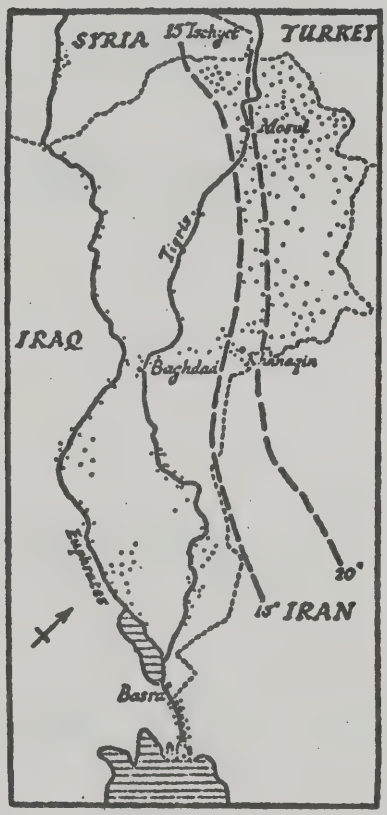

Fig. 65. The relation between Rainfall and Settlement in Iraq. (Settled villages shown as dots.) Rainfall increases eastwards towards the Zagros Range

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3. Read the article "Jarmo: An Early Farming Village." Then answer the following questions:

   a. What kinds of data indicating what life in Jarmo was like have been found?

   b. What were some of the goods and services that were produced in the village of Jarmo? What resources were used in producing these goods and services? Be as specific as you can.

Goods	Resources

   c. What domesticated plants and animals can we definitely say were present in Jarmo? What effects did domestication have on the production of goods and services there?

   d. With the types of implements that the people of Jarmo had, what kinds of soils would they have farmed? Explain.

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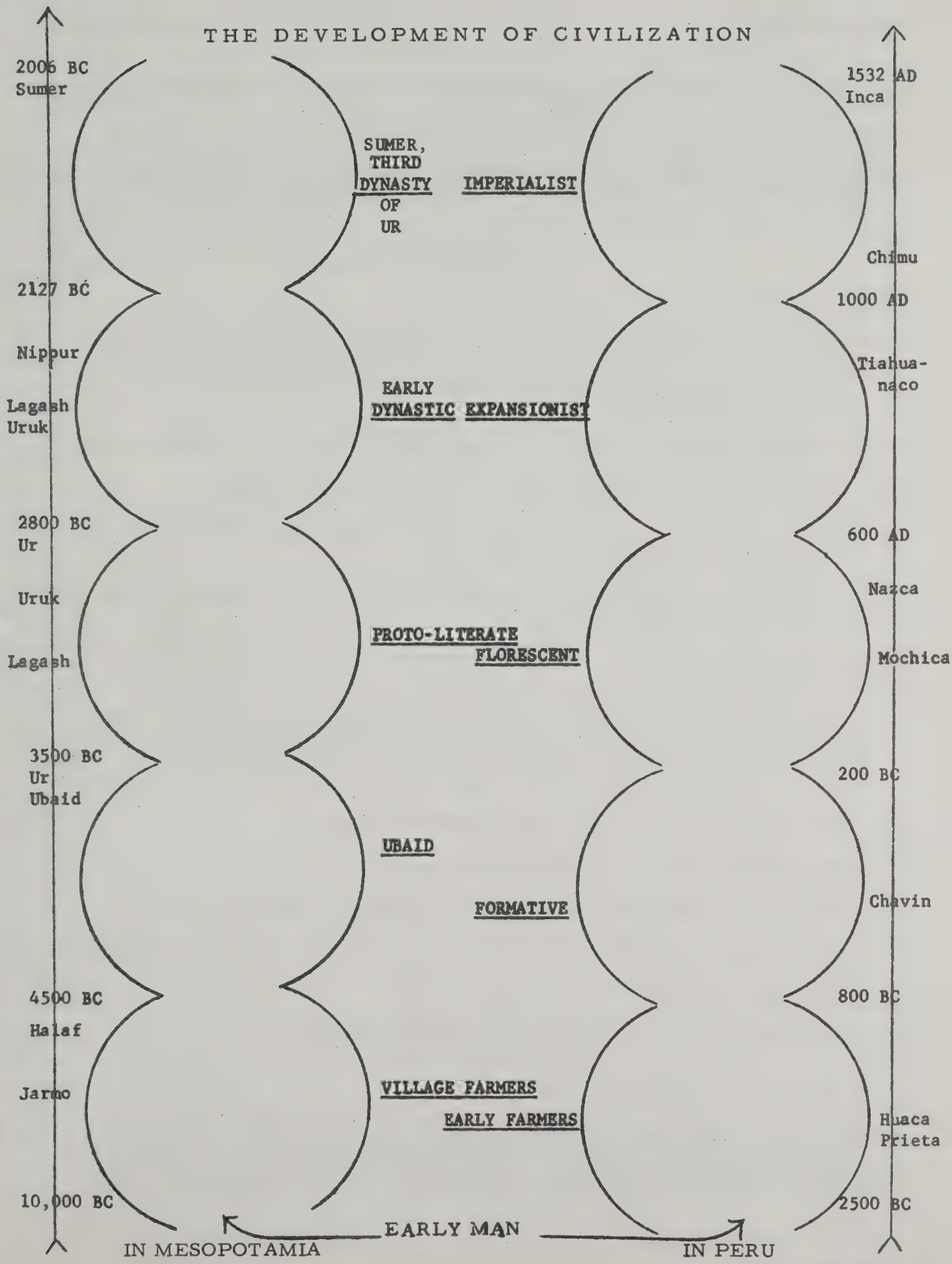

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4. Your teacher will give you instructions about the chart on page 103.

5. Read the following data about sites in Mesopotamia which were occupied during the Ubaid period. Then answer the questions following the article.

The Ubaid Period

Hassuna 5800 B.C.

(1) Hassuna produced a greater percentage of their food than did Jarmo. They can be described as an efficient agricultural community. Although their implements were still of stone, the people of Hassuna relied very little on hunting and gathering for subsistence.

(2) The village of Hassuna produced good quality pottery, beautifully decorated.

(3) They baked leavened bread, which is quite a technical advance.

(4) Evidently the village had the same trade routes as Jarmo--shells from the Persian Gulf and obsidian from Lake Van.

(5) The fertility cult is evidenced by a great number of fertility goddess figurines similar to those found at Jarmo.

Halaf 5000 B.C.

(1) Halaf is the name of a site near Hassuna which is not pictured on the map. The Halaf culture, however, extends as far as the Mediterranean. These people cultivated a wider variety of cereals than the people of Hassuna. They kept two breeds of cattle as well as pigs and sheep--and, of course, goats.

(2) Their pottery is technically better than that of Hassuna.

(3) Their claim to fame is the first wheeled vehicle.

(4) Also of major importance is the first appearance of copper and lead.

(5) Their villages had cobbled streets and circular houses with stone foundations.

(6) The ferility cult was still dominant.

(7) Halaf pottery has been found as far north as Lake Van.

Ubaid 4500 B.C. - 3500 B.C.

(1) The site for which this period is named is located very near ancient Ur.

(2) Ubaid materials also appear in northern Iraq, farther north than Hassuna.

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Summary

The Ubaid is a period of expansion and unification. It also marks the shift of cultural development from northern Mesopotamia to the southern alluvial plain. There have been no earlier sites uncovered in the Tigris-Euphrates basin. This suggests that people migrated into the region during Ubaid phase. We are not certain where they came from. The environmental conditions encountered by the new populations arriving on the Tigris-Euphrates plain have been described vividly by Gordon Childe in What Happened in History:[1]

> "In a small tract no larger than Denmark, on the Tigris-Euphrates delta, the ancient Sumer (Shinar in the Bible), the transformation can be followed step by step in the archaeological record. Sumer was new land only recently raised above the waters of the Persian Gulf by the silt carried down by the two rivers. It was still covered with vast swamps, full of towering reeds, interrupted by arid banks of mud and sand, and periodically inundated by floods. Through tortuous channels among the reeds the muddy waters flowed sluggishly to the sea. But the waters teemed with fish, and other game, and on every emergent patch of soil grew date palms offering every year a reliable crop of nutritive fruit.
>
> "In contrast to the arid desert lands on either side, this jungle must have seemed a paradise. If once the flood waters could be controlled and canalized, the swamps drained, and the arid banks watered, it could be made a Garden of Eden. The soil was so fertile that a hundred-fold return was not impossible. Actually, documents dating from 2500 B.C. indicate that the average yield on a field of barley was eighty-six times the sowing. Here, then, farmers could easily produce a surplus above their domestic needs."

1. Childe, Gordon. What Happened in History (Harmondsworth, England: Penguin Books, Ltd., 1954), pp. 89-90. Reprinted by permission of Penguin Books, Ltd.

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a. What were some of the cultural advances (over the culture of Jarmo) made by the Ubaid period? List them below.

b. Sometime during this Ubaid period, cultural development shifted to the river valleys. What would have been some of the advantages and disadvantages of river valley life?

c. What are some changes you think a move from the uplands to the river valleys would have made in the way of life of the Mesopotamians?

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6. Read the following article and prepare for class discussion the questions at the end of the article.

The Proto-Literate Period - 3500 B.C. - 2800 B.C.

In Robert Braidwood's words,

> It is our understanding that civilization would not have appeared on the basis of this new food-producing efficiency alone. We believe it was the further development of social, political, moral, and religious forces which made possible the integration of the growing populations into a functioning civilization. Without an elaborate written record, it is difficult to comprehend the exact strength of these latter forces. This is why the problem of the appearance of civilization is so difficult to examine."[1]

Dr. Braidwood has described the Proto-Literate as the period of prehistory when man was standing at the threshold of civilization. It may be helpful to think of this period in this manner, but it is also wise to remember that this period of "threshold" was 700 years long. It is difficult to point to the exact century when man stepped over the threshold into the complexity of civilized life.

The cultural developments at this period may be summarized as follows:

1. The period may be characterized by the phrase "incipient urbanization" with cities like Ur, Uruk, Lagash, Eridu and Nippur emerging as urban centers.

2. Picture form writing appears on clay tablets which are the forerunners of cuneiform writing.

3. Intensive agriculture was practiced with dates and fish as added supplements to the diet.

4. Complex canal irrigation systems were maintained.

5. Trade was extensive and probably stimulated the cultural development in Egypt.

6. The potter's wheel was invented, cylinder seals were widely used and the uses for metal were expanded.

7. Large temple estates called ziggurats were built. The temple estates were supported through taxes by agricultural surpluses. The first writing probably developed to keep the temple records.

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1. Braidwood, Robert J. The Near East and the Foundations for Civilization. (Eugene, Oregon: Condon Lecture Publications, Oregon State System of Higher Education, 1952), p. 6. Reprinted by permission of the University of Oregon.

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7. Be prepared to discuss the following questions in class:

   a. What effects would a complex irrigation system have on the culture of the people who built it?

   b. List some of the developments which might have resulted in Mesopotamian river valley culture as a result of agricultural surpluses.

   c. What would extensive trade indicate about a culture? Why was trade (both within the Tigris-Euphrates basin and as far away as India) so important in the development of civilization in Mesopotamia?

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d. What are some different aspects of a culture that might be affected by the development of writing? How would they be affected? Do you think the development of writing was a necessary prelude to the development of civilization?

e. How do you think Mesopotamian religion would have been affected by the move to the river valleys?

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8. An epic tale, the Epic of Gilgamesh, has come down to us from the time of the Early Dynastic Mesopotamians. Your teacher will play a tape on which this epic is told. As the tape is played, list below as many things about the culture of the Early Dynastic Mesopotamians as you can. Does this story remind you of any other familiar stories?

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Amplify your knowledge of the Early Dynastic Mesopotamians by reading the following article: Then prepare the questions after the article for class discussion.

Early Dynastic Period - 2800 B.C. - 2400 B.C.

A. This period can be characterized by fully developed urban centers.

A typical city was divided into three parts:

Walled area surrounding the temple, the palace for administrators and royal officers, and all other public buildings;

The suburbs, where groups of individual houses were situated close to the fields;

The harbour sector, the center of activity for the typical Early Dynastic City. Here foreign traders lived and carried on their commerce with the city.

During the latter part of this period several of the important capitals of lower Mesopotamia emerged. The city of Uruk extended over 1,100 acres and contained possibly 50,000 people. Lagash included in its domain 1800 sq. miles and a population of 35,000 people. Each city had its patron god. For a good summary, read "The Origin of Cities" by Robert M. Adams.

B. Technical writing developed at this time (cuneiform). Many of the tablets are our best source of information about this period.

C. Agricultural endeavors were extended to large estates and workers were paid in goods. The estates were owned by a god (temple). It was during this period that dynasties emerged (hence the name Early Dynastic). The originally god-owned temple estates became god-king owned and administered. In the later part of the period all city land belonged to the temple and the king administered over the city. The god was considered the true ruler and the king his administrator. So far kingship was not hereditary.

D. Warfare became increasingly crucial for the well-being and endurance of a powerful city. A constant struggle for power was waged between the various Sumerian City-States. The spoils of war were an important economic resource for cities. Victory in war depended upon the gods.

E. Nippur emerged as the sacred city of all of Sumeria. The Sumerians worshipped a pantheon of dieties, but each city had its patron diety or divine couple. The gods made their wishes known through oracles.

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F. Sumeria influenced the development in the Indus Valley during the Early Dynasty.

G. A rich class of Sumerians rose to economic supremacy through the manipulation of loans.

Akkad Period - 2400 B.C. - 2127 B.C.

This brief period is characterized by extensive trade (to Armenia, Cyprus and India). The first empire developed during this period. Its center of power was at Agade. The empire was controlled by royal families and the king was deified in his lifetime. (This period is not on the chart.)

---

8 (continued)

a. What can you say about Early Dynastic society?

b. What were some of the goods and services that were produced in Early Dynastic cities? What resources were used in producing them?

Goods	Resources
Services	

c. How important was religion to the people of Early Dynastic times? Give examples to support your answer.

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d. Where was power placed in Early Dynastic times?

e. If you were to choose certain changes which were essential to the emergence of urban life from village life in Mesopotamia, what would these changes be? Prepare a list of them.

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9. Sumer: The Third Dynasty of Ur

In about the twenty-third or twenty-fourth century B.C. (Some say it was in 2250 B.C. and others say it was in 2370 B.C.), something very important happened in Sumer. Up to this time there had been different city-kingdoms, each trying to "get ahead" at the expense of the others. Now there was unity. Sargon of Agade, (or Akkad, a land just north of Sumer), conquered all of Sumer and welded it into one state. The dynasty which he found lasted 100 years.

After the time of Sargon, there was an upsurge or revival of power and influence in Sumer. This time of revival, called by some a "new Golden Age," was the time of the Third Dynasty of Ur. It lasted from 2127 to 2006 B.C. (or 2124 to 2016 B.C., depending on whose dates you want to accept). Then it was overrun by peoples less sophisticated than the Sumerians, probably the Elamites from the East and the Amonites from the West. For two centuries these people controlled Sumer until the rise of Babylon to prominence in about 1800 B.C.

During the "new Golden Age" in Sumer, the most prominent city was the city of Ur. Ur had been vassal to Erech, but Ur-Nammu, ruler of Ur, turned the tables and gained control over Sumer. He called himself "King of Sumer and Akkad." According to one authority, Ur-Nammu "was a great conqueror and a great ruler, famous for his justice and his good works, whose dominions extended from the Persian Gulf to the Mediterranean, and his monuments were broadcast throughout the cities of Mesopotamia."[1] Remains of a law tablet indicate that one of the early acts of Ur-Nammu was to proclaim that during his rule he would see that people had fair dealings with each other, so that orphans would not fall prey to the wealthy, widows fall prey to the powerful, or poor men fall prey to wealthier ones.

Under Ur-Nammu and his descendents, Sumerian civilization flourished. Laws were set up that applied to all people in the realm. (Before, city law codes were regularly issued by Sumerian kings.) Some parts of the later Code of Hammurabi probably go back to the time of Ur-Nammu, though the "eye for an eye and tooth for a tooth" idea which was a part of the Code of Hammurabi and was a part of law codes described in the Bible, may not have been present. A law code, the code of Eshunna, dating from the early eighteenth century B.C., indicates that punishments consisted mainly of fines to be paid. The following provisions were taken from the code of Eshunna. Some of the same kinds of laws may have been a part of Ur-Nammu's law code.

> 9. Should a man pay 1 shekel of silver to a hired man for harvesting--if he does not fulfil his obligations and does not complete for him the harvest everywhere, he shall pay 10 shekels of silver. He shall receive 1 seah and 5 qa of grain as wages and leave the service. His rations of grain, oil and cloth shall be returned.

---

1. Goetze, Albrecht. "The Laws of Eshunna--Discovered at Tell Harmal," Sumer, IV: 2 (Sept. 1948), pp. 69-91. Reprinted in Cohn-Haft, Louis. Source Readings in Ancient History (New York: Thomas Y. Crowell Company, 1965). Reprinted by permission of Thomas Y. Crowell Company.

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25. If a man calls at the house of his father-in-law and his father-in-law accepts him, but nevertheless gives his daughter to another man, the father of the girl shall refund the bride-money which he received twofold.

29. If a man has been lost in a raid or an invasion, or if he has been carried off as a prisoner and lived in a foreign country for long days, and if another man has taken his wife and she has borne him a son--when he returns, he shall get his wife back.

34. If a slave-girl of the palace gives her son or her daughter to a muskenum for bringing him/her up, the palace may take back the son or the daughter whom she gave.

35. Also he who took the child of a slave-girl of the palace shall recompense the palace with its equivalent.

37. If a man's house indeed collapses and, together with the property of the depositor which he gave him, loss on the part of the owner of the house is incurred, the owner of the house shall swear nim an oath in the gate of Tishpak saying: "Together with your property my property was lost; I have done nothing improper or wrong." If he swears him such oath, he shall have no claim against him.

38. If one of the several brothers wants to sell his share in property which is common to them and his brother wishes to buy it, he shall pay half of what an outsider would have to pay.

39. If a man is hard up and sells his house, on the day on which the buyer pays, the owner of the house shall vacate it.

40. If a man buys a slave, s slave-girl, an ox or any other valuable object but cannot legally establish the seller, he is a thief.

56. If a dog is mad and the authorities have brought the fact to the notice of its owner, if nevertheless he does not subdue it, it bites a man and causes his death, the owner of the dog shall pay 2/3 of a mina of silver.

57. If it bites a slave and causes its death, he shall pay 15 shekels of silver.

58. If a wall is threatening to fall and the authorities have brought the fact to the notice of its owner, if nevertheless he does not strengthen his wall, the wall collapses and causes a free man's death, it is a capital offence; jurisdiction of the king.

Sumerian commerce may have extended as far as Egypt, India, and Anatolia. We know that the Sumerians obtained metals from Asia Minor, Palestine, and the Persian Gulf. Sumerian influence probably spread even farther as dominion was extended and the victors and vanquished influenced each other. Goods were

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floated down the upper rivers and then were sold, boats and all, as wood was scarce on the plain. Even the stone used for carving statues had to be imported. The bustling markets in Sumerian cities did a lively business. Some money-lenders became wealthy. Metal had replaced barley as a medium of exchange.

Literary life flourished. Thousands of scribes were needed in the realm for a wide variety of tasks. Almost all transactions in Sumer were written. There was a sizable body of literature growing up, too. Schools, probably first connected with temples and later secularly controlled, developed. Their curricula included the science of the day, mathematics, literature, and Sumerian. Students often practiced writing cuneiform by copying literary works onto their tablets. (This was lucky for us, since sometimes several copies of the same work have been preserved and we can piece together the legible parts of each copy to get the whole work.) A class of educated officials and scholars came out of the schools.

One piece of literature which has come down to us describes some of the Sumerian agricultural practices. The Sumerians used irrigation extensively. In some places the land was so fertile that two or three crops could be grown per year. The grains grown were mainly wheat, barley, and millet. The following excerpt is taken from the text of a literary debate between summer and winter. Note the importance of the gods in bringing abundance.

> Enlil, the air-god, has set his mind on bringing forth all sorts of trees and grain, and on establishing abundance and prosperity in the land. For this purpose, two cultural beings, the brothers Emesh (Summer) and Enten (Winter) are created, and Enlil assigns to each his specific duties. The following lines tell how these duties were executed:
>
> Enten made the ewe give birth to the lamb, the goat give birth to the kid,
> Cow and calf to multiply, cream and milk to increase,
> In the plain he made rejoice the heart of the wild goat, sheep, and donkey,
> The birds of heaven--in the wide earth he made them set up their nests,
> The fish of the sea--in the canebrake he made them lay their eggs,
> In the palm grove and vineyard he made honey and wine abound,
> The trees, wherever planted, he caused to bear fruit,
> The gardens he decked out in green, made their plants luxuriant,
> Made grain increase in the furrows,
> Like Ashnan (the grain goddess), the kindly maid, he made it come forth sturdily.
>
> Emesh brought into being the trees and fields, made wide the stalls and the sheepfolds,
> In the farms he multiplied produce, bedecked the earth. . . .,
> Caused the abundant harvest to be brought into the houses, the granaries to be heaped high,
> Cities and habitations to be founded, houses to be built in the land,
> Temples to rise mountain-high.

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Their mission accomplished, the two brothers decide to go to Nippur to the "house of life," and bring thank-offerings to their father Enlil. Emesh brings sundry wild and domestic animals, birds, and plants as his gift, while Enten chooses precious metals and stones, trees, and fish as his offering. But right at the door of the "house of life," the jealous Enten starts a quarrel with his brother. The arguments go back and forth between them, and finally Emesh challenges Enten's claim to the position of "farmer of the gods." And so they betake themselves to Enlil's great temple, the Ekur, and each states his case.[1]

The Sumerians made a number of important contributions to the field of mathematics. The following describes one very important contribution:

They were the first people to think of indicating the value of a number by its position: that is, of writing the numerical equivalent of five hundred sixty-three, not as 100+100+100+100+100+10+10+10+10+10+10+3 (which is what the Egyptians did, and the Romans, too, two thousand years afterward), but as we do: 5 followed by 6 followed by 3, where from their positions $5=(5x10^2)$, $6=(6x10)$, $3=3$.

What this meant in practical terms to, say, an accountant, can be imagined if one studies the problems of multiplying CCCCCLXIII, by, for instance, XLV; or the tediousness of working out the multiplication sum "13x11" Egyptian-fashion:

$$\begin{array}{rcl} 1 \times 11 & = & 11 \\ 4 \times 11 & = & 44 \\ \underline{8 \times 11} & = & \underline{88} \\ 13 & & 143 \end{array}$$

In fact, the Sumerians did not use 10 as their base. They chose 60, perhaps because it is divisible by all numbers up to 6, or because of considerations connected with their rationalizing of weights and measures. Whatever the reason, we are still thinking like the Sumerian-Akkadians when we look at a clockface with its 60 minutes or divide a circle into 360 degrees.

The mathematical advances might have been made without Ur-Nammu. They were developed in the countinghouse and spread by commercial document. The rulers of Ur, however, would do their utmost to further all that made government, trade, and commerce simpler, stabler, and less time-consuming. Ur-Nammu's own contribution to that end was standardization of all weights and measures, the first step toward our platinum bar and wave length.[2]

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1. Kramer, Samuel Noah. History Begins at Sumer © Samuel Noah Kramer. (Garden City, New York: Doubleday Anchor Books, 1959), pp. 137-138. Reprinted by permission of Samuel Noah Kramer.
2. Cottrell, Leonard. Land of the Two Rivers (Cleveland: The World Publishing Company, 1962), pp. 71-72. Reprinted by permission of the World Publishing Company.

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During the Third Dynasty of Ur, Sumerian crafts experienced a revival. Graves at Assur contained objects of silver, turquoise, gold, carnelian, and lapis lazuli that were as elaborate as grave offerings during the Early Dynastic period. Lagash, under the ruler Gudea (about 2200 B.C.), became a center for excellent sculpture. In Ur, there was a great deal of stonecarving. Figurines of both terra cotta and bronze were made. The bronze figurines were often made in one of three forms: a basket carrier, a bull lying down, or a kneeling god driving a peg in the ground. These figurines were often attached to pegs and were evidently driven in the ground when new buildings were constructed. Who knows, perhaps this is the origin of our "laying the cornerstone" ceremonies? There were probably craft guilds in major Sumerian cities by 2000 B.C. and contracts were made for teaching crafts.

Architecture was undergoing a revival, too. Walls around cities were made higher and wider for better defense and better flood protection. Houses contained a number of different rooms built around a central patio. The most famous kind of structure built during this time, though, was the ziggurat.

The ziggurat is an unusual feature of Sumerian architecture. No one is sure where the Sumerians originally came from, but perhaps they came down from the hills. People living in mountainous lands often worship their gods on high places. When the Sumerians came down to the alluvial plain, they found no high hills. Thus they built high places (ziggurats) for their gods. The steps of the ziggurats facilitated the descent of the gods to the earth. On top of the ziggurat was a small shrine and within it were underground chambers containing offerings.

Ur-Nammu had the Ziggurat of Ur rebuilt using the kiln-fired brick, replacing much of the old mud brick. The bricks are 15 inches or less long and they bear the royal seal. This may have been the accomplishment during his rule of which he was most proud.

In his book Ur of the Chaldees, Leonard Woolley has described some of his excavations of the Ziggurat of Ur.[1]

> When we were clearing the ruins of the sanctuary lying under the shadow of the Ziggurat on its northwest side we found, re-used as hinge-sockets in a later doorway, two fragments of limestone carved in relief; in the courtyard of the temple Dublal-makh, some hundred and fifty yards away to the south-east, more carved fragments were discovered which actually fitted on to the first two, and another piece apparently belonging to the same monument turned up in the ruins of yet another temple, E-Nun-makh.
>
> The fragments found thus widely scattered made up a considerable part of a limestone stela which originally measured 5 feet across and may have been as much as 15 feet high. It was sculptured on both sides and recorded in pictorial and in written form the achievements of Ur-Nammu. One scene at least commemorated the king's exploits in war, for we have him seated on his throne while prisoners

1. Woolley, C. Leonard. Ur of the Chaldees (New York: W. W. Norton and Company, Inc., 1965), pp. 129-131. Reprinted by permission of W. W. Norton and Company.

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with bound hands are led before him; two scenes show sacrifice to the gods; two panels, practically identical, are of a more unusual sort--the king is represented standing in the attitude of prayer, while an angel flying down from above pours water on the ground from a vase held between his hands. An inscription giving a list of the canals in the neighbourhood of Ur dug by orders of the king explains the scene: Ur-Nammu has been responsible for the actual earth-work of the canals, but he assigns to the gods credit for the blessed gift of water which brings fertility to the land. It is a pleasing instance of modesty in a great king, and the earliest representation of an angel in art.

But there was another act of which Ur-Nammu seems to have particularly proud, seeing that to it were devoted no less than three distinct panels of the relief, and that is the construction of the Ziggurat. In one scene the ruler is shown twice over making libations, on the one side to Nannar and on the other side to his wife the goddess Nin-Gal, and Nannar holds out to him the measuring-rod and coiled line of the architect, thereby symbolising his wish that Ur-Nammu should build him a house. In the next scene, sadly incomplete, the king obediently presents himself before the god bearing on his shoulder the tools of the architect and of the builder, compasses, mortar-basket, pick and trowel; in a third, yet more fragmentary, the workmen are seen carrying hods of mortar up ladders and laying the bricks of the tower. It is an extraordinary chance which has given us together with the best preserved of all the ziggurats of Mesopotamia the contemporary record of its building, and scarcely less extraordinary was the chance which brought together fragments deliberately smashed and so widely scattered. The monument is still very far from complete, but at any moment we may discover fresh bits of what is undoubtedly the most important sculpture known from Ur.

What do we know about Sumerian social life? For one thing, we know that marriages were contractual affairs arranged by the parents of the couple. Each man had one wife, though concubinage also existed. In the cities, families probably tended to live in smaller units (more nuclear than extended families). Women had rights and privileges and could do business and make contracts.

There were, in general, three classes of people in Sumerian cities. First, there were the government officials, religious leaders, scholars, and soldiers. In this class were included governors, ambassadors, sea captains, military officers, high tax officials, priests, managers, archivists, accountants, scribes, etc. Next were the free commoners, including farmers, laborers, artisans, toolmakers, shopkeepers, and merchants. In the lowest position were the slaves, including prisoners of war, criminals, debtors, etc. Even the slaves had their rights and privileges under the law, though, and they could not legally be mistreated.

Government in Sumer was tied closely to religion. We know that it took a great many officials--and a sizable civil service--to rule the Sumerian empire. These officials probably had religious as well as what we would term secular duties.

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We know that according to Sumerian beliefs a king was the vice-regent of god upon earth--'tenant-farmer,' they called him--and that the god was the real ruler of the land. The god then being the king, his court exactly reproduced that of his human representative. Attached to the principal temple there would be ministers of War and Justice, of Communications, of Agriculture, of Finance, of the Harem, and so on.[1]

We have proverbs that provide guidance to our actions. So did the Sumerians. These proverbs sometimes tell us a great deal about life as the people living it see it. The following are some of these proverbs and explanations of them:

The pig, interestingly enough was for the Sumerians one of the most "kosher" of animals, since the animal most frequently mentioned in the proverbs as being slaughtered for food is actually the pig! For example:

The fatted pig is about to be slaughtered, and so he says: "It was the food which I ate!"

Or:

He was at the end of his means (?), and so he slaughtered his pig!

Or:

The pork butcher slaughters the pig, saying: "Must you squeal? This is the road which your sire and your grandsire traveled, and now you are going on it too! (And yet) you are squealing!"[2]

No doubt the poor as a whole were submissive. There is nothing to indicate that the Sumerian poor consciously rebelled against the rich ruling classes. Nevertheless, their proverb, "Not all the households of the poor are equally submissive," if the translation is correct, does indicate a certain degree of class consciousness.[3]

Suggestive of Ecclesiastes 5:12, "The sleep of a labouring man is sweet," and particularly of the Talmudic "Who multiplies possessions multiplies worry," is this Sumerian proverb:

Who possesses much silver may be happy,
Who possesses much barley may be happy,
But who has nothing at all can sleep.[3]

Of the poor artisan who, ironically enough, could not afford to have the very things he made, the Sumerian said: "The valet always wears dirty clothes."[3]

1. Woolley, C. Leonard. Ur of the Chaldees (New York: W. W. Norton and Company, Inc., 1965), p. 145. Reprinted by permission of W. W. Norton and Company.
2. Kramer, Samuel Noah. History Begins at Sumer. © Samuel Noah Kramer. (Garden City, New York: Doubleday Anchor Books, 1959), p. 134. Reprinted by permission of Samuel Noah Kramer.
3. Ibid., pp. 122-124 abridged.

Clothes, incidentally, were highly appreciated by the Sumerians, for they said, "Everybody takes to the well-dressed man."[1]

In any case there were some valets who evidently succeeded in getting a formal education, to judge from the saying, "He is a valet who has actually studied Sumerian."[1]

Their humorous appreciation of the facts of life did not prevent the Sumerians from envisaging a better world.

"Who knows the orphan, who knows the widow,
Knows the oppression of man over man, is the oprhan's mother,
Nanshe, who cares for the widow,
Who seeks out justice for the poorest [?],
The queen brings the refugee to her lap,
Finds shelter for the weak. . ."

It comes as a shock to realize that this hymn to the goddess Nanshe was written 2,500 years before Christ.[2]

Above all, these people had both feet on solid ground:

"You can have a lord, you can have a king,
But the man to fear is the tax-collector."[2]

The Sumerian husband felt himself frequently neglected, as shown in the saying:

My wife is in "church" (literally "the outdoor shrine"),
My mother is down by the river (probably attending some religious rite),
And here am I starving of hunger.[1]

And a marriageable young girl considers her course of action anxiously:

"Who is well-established, who is wind--
For whom shall I hold my love?"[2]

As for the mother-in-law, she seems to have been far less difficult than her modern counterpart; at least, no Sumerian mother-in-law stories have as yet come to light. In ancient Sumer it was the daughter-in-law who had an unenviable reputation. This seems evident from a Sumerian epigram on what is good and bad for a man, which reads:

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1. Ibid., pp. 122-124.
2. Cottrell, Leonard. Land of the Two Rivers (Cleveland: The World Publishing Company, 1962), p. 55. Reprinted by permission of the World Publishing Company.

The desert canteen is a man's life,
The shoe is a man's eye,
The wife is a man's future,
The son is a man's refuge,
The daughter is a man's salvation,
The daughter-in-law is a man's devil.[1]

Friendship was highly valued by the Sumerians. But, as with ourselves, "blood was thicker than water." As they put it:

Friendship lasts a day
Kinship endures forever.[1]

---

9 (continued)

After you have finished the article "Sumer: The Third Dynasty of Ur," answer these questions.

a. What can you say about social life in Sumer (families, classes, etc.)?

b. How did socialization take place in Sumer?

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1. Kramer, Samuel Noah. History Begins at Sumer © Samuel Noah Kramer. (Garden City, New York: Doubleday Anchor Books, 1959), pp. 122-124, abridged. Reprinted by permission of Samuel Noah Kramer.

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c. Describe Sumer's money economy.

d. Why was trade so important to the economy of Sumer?

e. What summary statements can you make about Sumerian religion?

f. What kinds of arts and crafts were present in Sumer?

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g. What statements can you make about Sumerian government?

h. How was the Third Dynasty of Ur different from the earlier periods of cultural development in Mesopotamia?

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Your teacher will show you three slides. The following space may be used for notes about what you see in the slides.

a.

b.

c.

Compare what you have seen in these slides with what you know about similar things in Mesopotamia.

What resources were available to the people whose town was shown in the slides?

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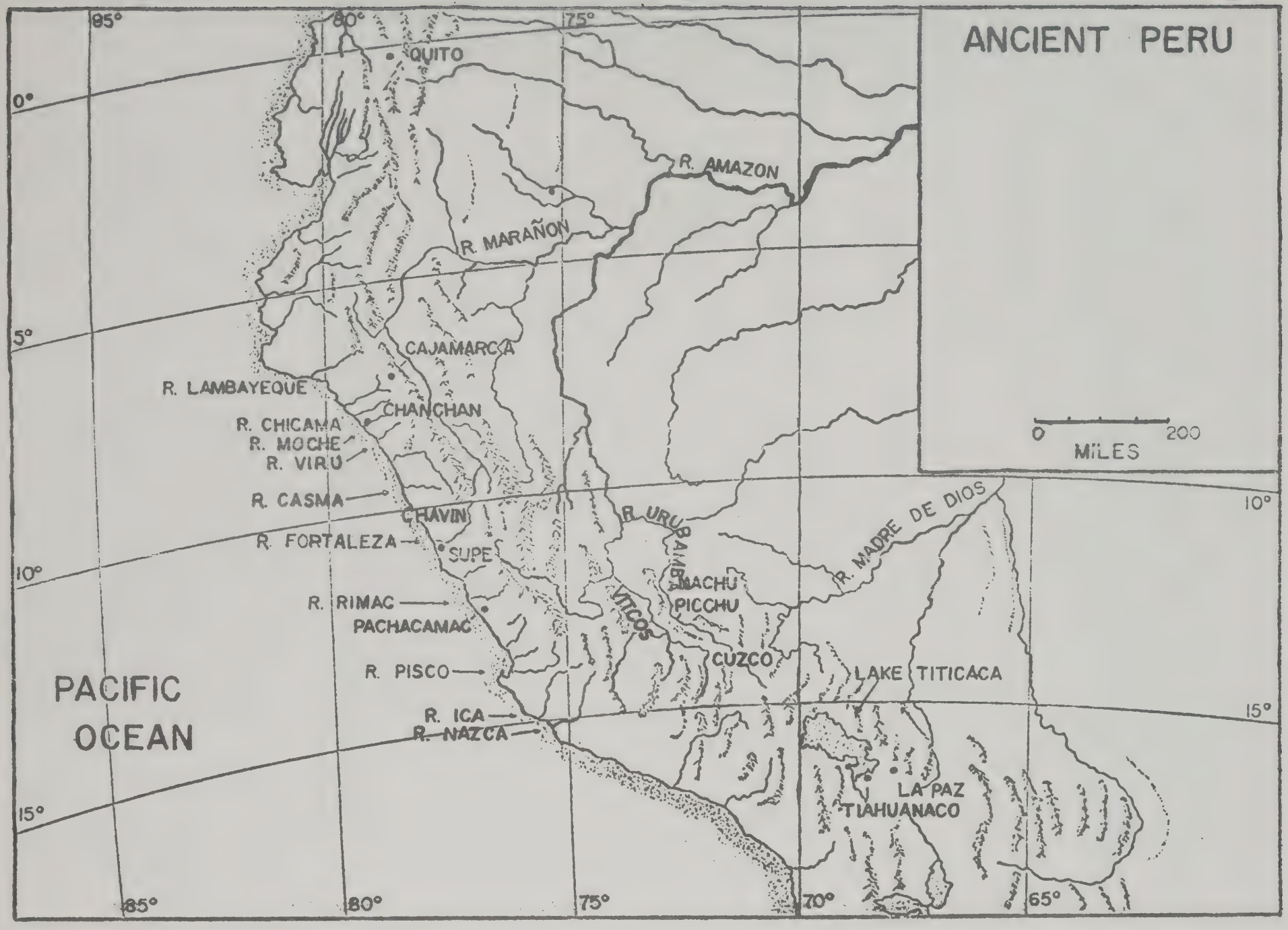
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R. CASMA
CHAVIN
R. FORTALEZA
SUPE
R. RIMAC
PACHACAMAC
R. PISCO
R. ICA
R. NAZCA
PACIFIC
OCEAN
R. URUBAMBA
VILCOS
MACHU
PICCHU
CUZCO
R. MADRE DE DIOS
LAKE TITICACA
LA PAZ
TIAHUANACO

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ANCIENT PERU

1. Your teacher will show you a transparency that points out another area of the world where an ancient civilization arose. From your studies in geography, what do you recall about the physical environments of this part of the world? Consider one aspect of the physical environment at a time. Record your ideas and observations as well as the important contributions of your classmates in the space below.

   a. Landforms and Drainage -

   b. Climate -

   c. Given the landforms and climate that you have discussed thus far, what type of vegetation would you find in this area? Check your answer as you view the transparency.

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d. What statements can you make about the soil that would likely be found in this area?

What do you think is necessary in order to have agriculture along the coast and in the highlands?

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2. Read the following paragraph and note some other important aspects of the physical environment of Peru.

"The narrow coastal region is an extremely arid but temperate desert cut transversely at intervals by mountain-fed rivers that form oasis valleys. The highland consists of intermontane valleys and basins separated by lofty plateaus and high mountain passes. In the coastal valleys intensive agriculture is dependent on irrigation, although small-scale cultivation is possible without irrigation in the moist areas at valley mouths close to the sea. In the mountain valleys irrigation is less vital, but everywhere it increases crop yields. In spite of difference between coast and highland, there are certain major uniformities. Both regions have large cultivable areas with rich soils not covered with resistant grasses or forest and with water available for irrigation. Temperature and other contrasts due to differences in altitude are minimized by the cold Peru current and proximity to the equator. The Peru current also accounts for an exceptionally rich marine fauna, which amply compensates for the barrenness of the coastal desert. Both coastal and highland valleys are geographically isolated but close enough to other valleys for trade and cultural interchange."[1]

What summary statements can you now make that would be descriptive of the physical environment of the area of Ancient Peru?

Now consider the natural environment in relation to the emergence of a civilization. What opportunities does it present and what hardships does it impose?

1. Collier, Donald. "The Central Andes" in Braidwood, Robert J. and Gordon R. Willey, Eds., Courses Toward Urban Life (Chicago: Aldine Press, 1962). Reprinted by permission of Aldine Press.

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3. AN EARLY FARMING VILLAGE IN PERU: HUACA PRIETA (2500 B.C. - 1200 B.C.)

What was an early farming village on the coast of Peru like? Did it resemble the farming village of Jarmo, Iraq (7000 B.C.)? If Huaca Prieta, which was inhabited over 4000 years ago, was a farming village, what crops were grown there?

As you will remember, the name Jarmo was given to that site by archaeologists. The name Huaca Prieta, on the other hand, was given to the site by the people living near it. The word "Huaca" refers to a mound or "something-associated-with-the-ancients" and the word "Prieta" means dark. The "dark mound" is a forty-five foot accumulation that has been undisturbed by "Huaqueros" over the centuries. The "Huaqueros" soon learned that this mound did not contain any of the valuable gold, textiles, or pottery that they were accustomed to plundering.

Most archaeologists today would give two golden vessels to find substantial evidence of early agriculture! They thus consider themselves fortunate to find early sites like Jarmo or Huaca Prieta that have remained undisturbed over the centuries. These sites offer very important clues about the beginnings of village life. In Peru, such early village sites often contain only bone and stone implements, gourds, and, of course, animal, plant, and human remains. Sites like Jarmo in the Old World and Huaca Prieta in the New World provide important information about the first permanent villages and the beginnings of agriculture.

Huaca Prieta is located at the mouth of the Chicama Valley. It is one of more than thirty preceramic sites known on the coast of Peru. These sites were either early farming or fishing villages or probably a combination of both--fishing villages that practiced simple agriculture or farming villages that relied on seafood for their protein. Interestingly enough, bones of land animals are rare at Huaca Prieta and very few hunting weapons have been found. There are a few bones of porpoises and sea lions, however.

Well-watered places near major rivers do not seem to have been generally preferred as living sites at this time. Perhaps the danger of flooding overshadowed the advantages. Most preceramic sites are near present or former marshes. Today, these desert sites would be the last places we would look for early village settlements. In most cases, however, investigation has shown traces of underground water which once may have been more abundant.

The Chicama Valley must have been quite different before it was settled by intensive agriculturalists. There must have been more swampland, lagoons, and wooded thickets, and a wider area devoted to marginal desert vegetation. Wild animals, birds, wild fruits, and other wild food plants were probably more abundant. From the remains in the midden (mound), it appears that subsistence depended heavily upon seafood.

Seafood alone, though, would not have supported Huaca Prieta's estimated population of 150 persons. Their diet also included several wild plants such as various roots (tubers), cattail roots, and fruits. It is

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believed that they cultivated squash, a tuber called achira (which is like a big parsnip), lima beans, and chile peppers as well as cotton and gourds. However, there is no evidence for domesticated animals. Gourds were used as drinking vessels, as spoons, and as bowls, because the art of making ceramics was unknown to the first inhabitants of Huaca Prieta.

The early farmer-fishermen of the coast of Peru were very skillful in making textiles. They made fishing nets and rectangular cloaks of natural white and brown cotton. The designs on the cloaks were quite complex, a two headed snake being the most common motif. Blue dye or a red pigment were rubbed into the threads either before or after the garment was made. Feathers, which were obtained from the tropical regions inland, were often sewn into the cloaks for decoration. Were these worn only by a priestly class or an upper class? Or were the fine feather garments "dress-up clothes" for the common man? We cannot determine this from the archaeological evidence at Huaca Prieta.

One thing must be explained about the beautiful Peruvian cotton textiles of 4,000 years ago. They were not woven with a loom but, instead, they were twined. Two threads were twined together and knotted, and then another thread was stitched through these two with a bone needle. A series of these double twined threads going vertically and the stitched-in thread going horizontally produces almost the same effect as loom weaving. As time went by, however, loom weaving gradually made its appearance and replaced the "twining" technique. The latest level, dated 1200 B.C., contains loom woven textiles. Twined textiles disappear, never to be found again.

Houses

The people of Huaca Prieta experimented with several different types of houses over the 1300 years of occupation. Most of the structures appear to be late in the period. The most common type of house is a small, single room, commonly oval, subterranean house, though single room houses have also been found on the surface. The interior of the house was usually lined with the cobble stones and the house was roofed with wooden beams or whale-bones covered over with stones and mud. Other materials, such as the following, were also used for house construction: handfuls of hard, unshaped salene clay, large uncut stone for walls, and crudely-made rectangular mud bricks. Post holes indicate that houses were also constructed of canes and rushes.

Preceramic to Ceramic

Sometime before 1200 B.C., simple cooking pots were being used at Huaca Prieta. The vessels were irregular in color, being dull red to dark brown or black from a lack of oxygen in firing, and they were very simply decorated, the only decorations consisting of ribs or ridges made by pinching or notching the wet clay.

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Why are we so concerned with the first appearance of pottery? Ceramic objects are certainly simple enough today to make. It seems to be the case, though, that whenever pottery first appears in the archaeological remains of a culture, a proliferation of new types of objects appear simultaneously or shortly thereafter. The many new objects suggest some type of "breakthrough" in technology. Most often this "breakthrough" is closely associated with the emergence of intensive cultivation of one or more surplus-producing crops.

After pottery makes its appearance in the strata of Huaca Prieta, a few cobs of low yielding corn appear. Much later, a different species of corn is found throughout Peru. It has been suggested that this high yield corn came south from Mexico. But there are people who disagree with this suggestion.

Religion

The last aspect of the life of the early farmers that we will consider is the development of their religion. In the Supe Valley there is a structure which may represent one of the earliest religious buildings in Peru. The building consists of a large room about twelve feet square which is connected by doors to two adjacent smaller rooms. The walls of this building are of uncut stone held together with mud plaster and are about three and a half feet in height. The floor is made of packed clay. In the center of the large room stands a platform about four and a half feet square and about twenty inches high. The platform is constructed from uncut boulders set on end with smaller stones filling in the spaces. The base of the platform is covered with mud plaster.

Pottery has not been found associated with this early religious center, but cobs of productive corn have been found. This serves to tell us that the site probably dated after 1200 B.C. Also, llama bones, presumably sacrifices, have been found near the altar. Llamas are not native to the coast, and thus they must have come from the highland either as trade, tribute, or captured booty. We have no way of knowing.

Burials also serve to tell us something about the early religious practices of the coastal farmers. The earliest burials at Huaca Prieta are flexed burials in shallow pits in the midst of refuse piles. However, later, abandoned subterranean houses and storage pits were used as burial grounds. The structure intended for graves was lined with cobble stones or adobe bricks and the body was bundled up and placed carefully in the grave. More grave goods were seen in the later burials--even a few ceramic figurines, as well as jet mirrors, shells, pottery roller stamps, and beads and weaving tools.

Some archaeologists view the appearance of corn and the great variety of grave objects found in the late (1200 B.C.) Early Farmer sites as an indication of the arrival of a new population. They argue that these people brought with them a productive variety of corn, better pottery, and the back-strap loom. We do not know the origin of these hypothetical late arrivals. Did they also bring with them a new religion?

We have no way of knowing what songs these early Peruvians sang or what jokes they told or even what prayers they prayed. None of these activities have left any traces. But we can guess that they used the mild

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narcotic, "Coca," that is so popular in Peru today. At Huaca Prieta a small cord bag with a chewed quid, presumably of "Coca," was located in a burial. Today, a chewed quid of "Coca" is believed to be a cure for ailments such as kidney trouble and toothache. Possibly the chewed quid was placed in the grave of a sufferer of toothache or kidney trouble 4000 years ago, just as an Indian would place a chewed "Coca" quid in a relative's grave today.

3 (continued)

a. What kinds of evidence do we have about life at Huaca Prieta? Are there any aspects of life at this period about which we have no information?

b. What did the people of Huaca Prieta eat? How is this different from what the people of Jarmo ate?

c. What were the buildings there like?

d. What were some of the goods and services produced at Huaca Prieta?

e. Compare life at Jarmo with life at Huaca Prieta. How were Jarmo and Huaca Pirta similar? How were they different?

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4. A TRIP TO CHAVIN

If you were to visit Chavin, a 2500-year-old ceremonial center on the outskirts of the little village of Chavin, you would take the biweekly mail truck out of Huaras, Peru, and travel some five or six hours over a dirt road. The road cuts through a glaciated mountain pass at an altitude of about 15,000 ft. and passes through several valleys and villages before arriving at Chavin.

The trip would be very exciting and eventful, indeed. The mail truck is the only means of public transportation in this area; there are no busses to Chavin. Quechua-speaking Indians take their produce to various village markets via the mail truck, and when a village has a "fiesta," people from miles around stand patiently on the road in order to catch a ride on the truck. Even if you speak Spanish, you might not be able to talk to anyone during your journey to Chavin unless you speak Quechua also. You might even have to sit on stacks of sugar cane or bags of potatoes or defend your position against the many goats and sheep that will be in the truck with their Indian owners.

Arriving in Chavin, which is a small village in the fertile Mosna Valley, you will be able to find several people who speak Spanish. You will also be able to find a room and a place to eat. You will want to take sturdy boots and warm clothing since Chavin is at an altitude of about 10,200 ft. The noonday sun is intense here but the nights are very cool. Not many of the local people will be able to tell you much about the "Castillo," as the temple of Chavin is called. Although everyone will be able to direct you to the ruins, there is only one man in the village, Senor Marino Gonzales Moreno, who will be helpful in your exploration of Chavin. Dr. John H. Rowe, an archaeologist from the University of California, has dedicated a book to Sr. Gonzales called Chavin Art: An Inquiry into its Form and Meaning. Dr. Rowe calls Sr. Gonzales the "Savior of Chavin", as Sr. Gonzales has been very instrumental in the preservation and interpretation of Chavin. He has excavated and repaired the east facade of the temple, and he has assisted Dr. John Rowe in several "digs." He has found and preserved many of the stone sculptures that have made Chavin famous as well as acted as a guardian of the temple, helping to stop the vandalism of Chavin art. He has skillfully and carefully documented excavations, beginning in 1954. His efforts have thrown a flood of new light and understanding on Chavin.

Sr. Gonzales is a native of the town of Chavin. He speaks Spanish very well, but, of course, he speaks no English. He is one of six million Indians in Peru and Bolivia who speak Quechua or Aymara. He is an amateur archaeologist who is well respected by scholars all over the world for his work at Chavin. When someone arrives in this little village interested in the ancient ruins, he is a helpful, well informed, and enthusiastic guide.

Sr. Gonzales would be able to explain to you the overall plan of the site. The temple consists of three stories of rooms, galleries, and passages, and many of the rooms have never been excavated and cleared. Many are filled with dirt, stones, and the rubble that has accumulated since Chavin was a ceremonial center in 700 - 200 B.C.

When Sr. Gonzales shows you the temple, he will probably first take you to the east facade and show you the Black and White Portal which he excavated and repaired in 1955-1956. The south half of the portal is constructed of white granite

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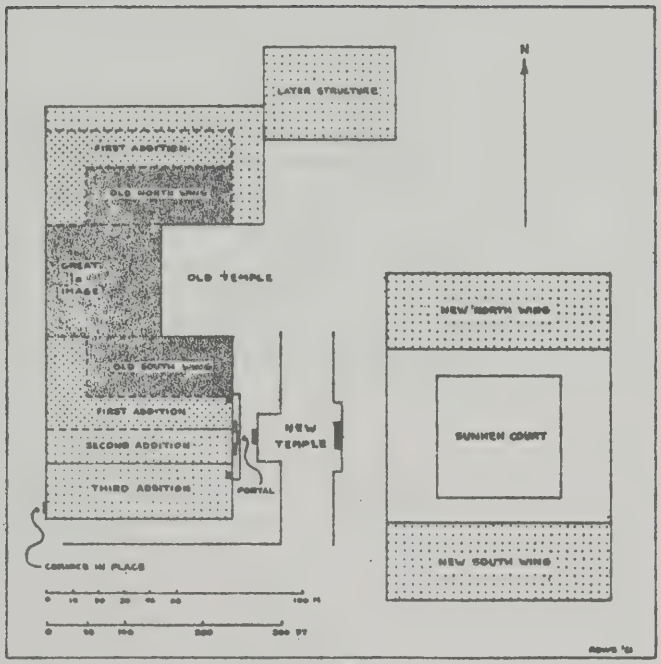

Map of the temple construction of Chavin[1]

1. Rowe, John H. Chavin Art: An Inquiry into its Form and Meaning. (New York: The Museum of Primitive Art, 1962), p. 9. Reprinted by permission of The Museum of Primitive Art.

and the north half of black limestone. This is why it is called the Black and White Portal. We do not know whether the colors were of religious significance. As you see from the temple floor plan, the portal is the entrance to the second addition of the temple.

The enlarged south wing of the building was then treated as the main building. Why? Dr. Rowe suggests that this may reflect an increase in the importance of a deity which has originally been worshipped in the south wing. As this deity gained importance and influence, the "Great Image" deity probably lost influence. The image of the deity of the south wing has never been found. It probably was destroyed centuries ago.

Sr. Gonzales would lead you through one of the dark, narrow, stone passages, most of which measure three feet wide and six feet high, to the room of "The Great Image." "The Greak Image" stands in the oldest section of the temple. It is one of the very few cult objects of Ancient Peruvian religion that can be seen in its original setting. The image is of white granite, about 14 feet 10 inches in height, carved in low relief to represent a human figure with his right hand raised. The size of this image and its setting in a dark passage give it an awesome quality. You will be glad Sr. Gonzales is with you! Although the "Great Image" is of human form, he has a great "smiling" jaguar mouth with two large tusk-like or fang-like teeth and he also has "snakey hair." You would be shown a slide of this "Smiling God."

You might ask yourself why the people ofChavin used the jaguar mouth and snakes for hair in their sculptures. Dr. Rowe has been puzzled over this question, also. He has come to some interesting conclusions after an intensive study of Chavin art.

Dr. Rowe suggests that the use of the jaguar mouth for a human mouth probably conveyed a special meaning to its viewers. The jaguar is legendary throughout tropical America for its courage and strength. The cat's mouth is found on figures of snakes, of human figures, of birds, and, in its natural context, on representations of all types of cats. The logic behind this is obscure. Perhaps the cat mouth is used to distinguish divine and mythological beings from ordinary creatures of the world of nature. The implication is that this is a comparison between the power of the jaguar and supernatural power. (Rowe, 1962, p. 16) Therefore, every time a worshipper came to the room of the "Great Image," he would understand the tremendous supernatural power and strength of the diety by looking at his powerful jaguar mouth.

Another illustration of this type of "message" in religious art that is readily understood by the viewer is the use of the halo to depict goodness and saintliness in Christian art. Anyone viewing a painting of the Virgin and Child understands what the halo over her head means and why the artist has painted it there. The same was true for the observer of the jaguar mouth in ancient Chavin art; he knew why it was carved and what it meant.

Two things you will want to bring to Chavin are carbon paper and large sheets of good quality paper. You are probably thinking "Good Heavens, what for?" Most of the art of Chavin is in the form of stone relief carving. You'll find, though, that by placing a large sheet of paper over a statue or carved cornice and rubbing

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carefully with the carbon paper, you can produce a beautiful black and white reproduction of the statue. Sr. Gonzales will be very glad to help you. He knows where all of the interesting statues and relief carvings are.

Chavin was a ceremonial center but not an urban center. The small rooms of the temple would have made poor living quarters. However, the temple does have a well planned system of stone air vents measuring 16 inches by 18 inches that supply fresh air even to the lowest interior rooms. Along the edge of the river bank there is a row of six small cells, lined and covered with stones. Did ancient priests live here? Or, perhaps, priests lived in the few house constructions that have been found on top of the temple. No one knows. However, we can be sure that Chavin's population has not changed much over the centuries.

The many additions to the temple suggest that Chavin was built over a very long period of time by religious pilgrims. The changing styles found in the various additions give support to the idea that the temple was built floor by floor, addition by addition, over several hundred years.

Chavin style came to an end about 200 B.C., but we still know very little about the circumstances of this. We do know that the style had spread over a large area. The site of Chavin marks the southern limit in the sierra of the objects in the Chavin style that have so far been discovered. (The country south of Chavin is little known and may turn out to be full of Chavin sites!) The Chavin style has been traced as far as 250 air miles north and 250 air miles west. On the coast the style has been found from Curayucu, a little south of Lima, to as far north as the Lambayeque Valley.

Two other imposing temple sites have been found in the sierra, one called "Kuntur Wasi" at La Copa west of Cajamarca, and the other at Pacopampa in the northern part of the Lambayeque valley. On the coast there is a great Chavin temple a few miles north of Lima which is very similar to the one at Chavin. Any of these could have been the center of Chavin cultural influence, or the origin of the Chavin culture could still be undiscovered.

After 3 or 4 days in Chavin you would probably bid Sr. Gonzales goodby and climb into the back of the mail truck. You will have to protect your carbon rubbings of Chavin art from the crush of Indians' sheep, goats, and sacks of produce on their way to market. Perhaps one day you will return to Peru and to ancient Chavin. There is still so much more to see!

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Notes on Slides of Chavin

Slide 1181 shows the "Black and White Portal" at Chavin. A close-up of the carving on the columns is shown in Slide 1182. Slide 1183 shows one of the Megalithic heads that adorn the temple facade. (The map with your reading points out the original position of the head.)

Slides 1184, 1185, and 1186 are all photographs of carbon rubbings taken at Chavin. The reading explains how rubbings are done. All of the rubbings are about 20 inches by 20 inches. Slide No. 1184 is a rubbing of the stone relief carving of the major diety at Chavin. Dr. John H. Rowe, of the University of California, has named this god "The Smiling God" because he thinks that he looks very cheerful! This diety is the same one that is depicted in the cult image that has been named "The Great Image." A full description of "The Great Image" is in the reading. The diety has the Jaguar mouth, snake hair, and claw feet that are so typical of Chavin art.

Slide 1185 is a photograph of a rubbing of a warrior; he is carrying a stone mace in one hand and in the other hand he is carrying a club in the form of a snake. Notice that he has a Jaguar mouth, and a cat's tail. Why do you think the artist chose to carve the warrior with these animal characteristics?

Slide No. 1186 is very interesting in that it is a more naturalistic carving of a Jaguar except for one feature. What is <u>not</u> naturalistic in the rubbing? Why do you suppose the artist put crab-like feet on a cat? The rubbing is interesting because it perhaps is an example of very early art at Chavin. Note that it is less complex and much more naturalistic.

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4 (continued)

a. Write below the primary attainments and attributes which mark Chavin culture.

b. What kind of site was Chavin? Does this put any limitations on our data?

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5. a. Your teacher will show you several slides. What inferences can you make about Mochica culture from looking at these slides?

Slide (1)

Slide (2)

b. As you read about two Peruvian cultures in the Florescent Period, the Mochica and the Nazca, be watching for similarities and differences in the two cultures. Compare these two cultures below:

Mochica	Nazca

c. Why do you think these similarities and differences exist?

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Check the inferences you made in 5a. Were you correct?

e. Your teacher will project a transparency which will show the spread of Mochican and Nazcan influence. Compare the area of influence of these two cultures. How do you explain the differences and similarities in spread of influence? What was going on at this time in Peru?

f. How are these Florescent cultures different from earlier cultures in Peru?

g. Does there seem to be a link between improved agriculture, increased population, and increased warfare? Explain.

h. What summary statements can you make regarding the Florescent period in Peru? Fill in the section on your chart marked FLORESCENT period.

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THE MOCHICA: A Culture in a Land Where it Never Rains

Mochica is the name of a language that was spoken by the Chimu people of the north coast of Peru, and today there are still some people on the north coast who remember a few words of the ancient language. The Chimu people lived during a period of Peruvian prehistory that is called the Regional Florescent Period. The word "florescent" indicates the flowering and perfecting of crafts such as ceramics, weaving, and metallurgy as well as the maturing of complex engineering and architecture. "Regional" is used to help us bear in mind that these developments took place in various different regions throughout Peru during the first five or six centuries A.D.

We will examine only two cultures of the Regional Florescent Period: the Mochica on the north coast and the Nazca on the south coast. These are only two of the many regions that experienced a rapid perfecting of aesthetic and utilitarian crafts. This perfection is exemplified in Mochican pottery and Nazcan textiles.

Mochican pottery is famous for the stirrup spout, realistically modeled, portrait vessels and for beautifully painted vases depicting every phase of Mochica life, including people and houses, farmers with their produce, judges passing sentences on prisoners, women giving birth, and beautifully arrayed warriors as well as conquered enemies.

The Mochicans were not only excellent craftsmen and engineers; they were excellent farmers as well. They not only dominated the rich river valleys but also brought marginal lands under cultivation by means of complicated irrigation systems. The canals in use in later times, including the aqueduct of Ascope, one of the master engineering works of ancient Peru, were probably built by the Mochicans. The Ascope aqueduct, located in the Chicama Valley, was fifty feet high and carried water across a dry ravine for almost a mile. The aqueduct had a cubic content of 785,000 cu. meters of earth and a weight of more than two million metric tons.

The domesticated llama, the alpaca, and the guinea pig were raised as food animals. The Mochicans were no exception to other early peoples in that they kept man's oldest friend, the dog, as a household pet. They also captured young deer, pumas, monkeys, and parrots in order to keep them as pets.

The total range of Central Andean domesticated plants was established by this period, and no new plants were added until the Spaniards arrived. The principal plants the Mochicans cultivated were corn, beans, peanuts, potatoes, yuca, sweet potatoes, hot peppers, pumpkins, coca, cotton, and many tropical fruits. They also cultivated various herbs that were used for medical purposes. It is interesting to note that several important crops--the potato, peanuts, yuca (sweet manioc), the sweet potato, and three other tubers are all root crops. The standard agricultural techniques included the use of the digging-stick, the hoe, and fertilizers, and all other specialized methods now known in the Central Andes were probably implemented by the

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end of the period. Hunting appears to have been relegated to an upper-class sport, and food gathering did not play an important part in the economy. Fishing, however, continued as an important protein source, as it had been in Huaca Prieta and Chavin times.

It is estimated that the population of the Viru Valley increased five-fold during the Regional Florescent Period. One of the major factors was, of course, the increased technology applied to agriculture, including the system of irrigation that connected the valleys and made them so productive. Another factor was probably the effective political structure which allowed greater productivity. From studying the thousands of Mochica vessels that have been collected, it is clear that the Mochicans had a rigid political structure that controlled the irrigation systems, agricultural production, and crafts, and maintained legal courts and disciplined armies.

The Regional Florescent Period is generally characterized by construction of large public works, usually identified as temples or forts, canals, aqueducts and roads. One of the largest constructions of the period is "Huaca de la Luna" or pyramid of the moon, a step-sided platform, 275 by 200 feet, terraced against the side of a hill. The base served as a burial vault for priests and administrators. Nearby is a similar structure that is even larger. This is the "Huanca del Sol" or Pyramid of the Sun. Its base is 450 feet long by 750 feet wide. A step-sided pyramid 340 feet square and 75 feet high caps the platform. (Bennett and Bird, 1964, p. 120.)

Around the huge temple structures of Mochica times were growing the first large villages. Still held together by religious authority, the crowded Mochica people lacked real planned cities, but the basic ingredients for urbanization were present, and only a brief but strong stimulus from the far off South Highlands was necessary to bring about a full scale urban development. Keep this in mind as we look at the subsequent periods of Peruvian prehistory. The north coast, during the Mochica period, was "ripe", so to speak, for further cultural and technological developments. The period is characterized by the perfection of crafts, the mastery of hydraulic engineering, and the emergence of secular authority. We will now turn to the South Coast and discuss our other example of Regional Florescence in Peru.

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THE SOUTH COAST: THE NAZCA CULTURE OF THE REGIONAL FLORESCENT PERIOD

We have looked at the north coast cultural developments of the Regional Florescent Period. The north coast valleys are much larger than those of the south coast, and they supported larger cultivated areas and larger populations. The valleys of the south coast supported a cultural development similar to the Mochican in many ways but different in others. As you read, see if you can point out similarities and differences between the Mochica and the Nazca cultures.

The south coast is just as dry and in places dryer than the north coast. Fortunately for archaeologists, perishable items such as textiles, wood, featherwork, and basketry are preserved. In fact, at one ceremonial site called Cahuachi in the Nazca Valley, one group of rooms contained so many textiles that the archaeologists working on the site believe it to be an organized weavers workshop. One can almost think of it as an ancient textile mill, but, of course, all of the work was done by hand on the traditional back-strap loom.

This ceremonial center consists of at least six small pyramids, each associated with a court, the "ancient textile mill," and wattle-and-daub houses. The pyramids are natural hills which have terraces, steps, and adobe facings added. These small natural hill pyramids by no means compare with the huge pyramids of the sun and of the moon. The wattle-and-daub houses were built within the same area as the pyramids and the area was densely populated, although it was not yet an urban center.

The Nazca Culture flourished in the Nazca, Pisco, and Ica valleys and also in the smaller valleys to the south. The Nazca ruins and artifacts give little indication of fortification and aggressive expansion that have been discovered on north coast. The main motifs of Nazca pottery are anthropomorphic animals and deities (animals with human features or forms). Most common are centipede-like and feline figures and stylized designs of birds, fruits and fish. The "trophy head" is widely used as a motif, which suggests that human sacrifice and the taking of heads was practiced. The warrior, as seen on Mochica designs, does not appear in Nazca art.

Many such examples of design preferences come from textiles found at one of the largest cemeteries discovered on the south coast, Paracas Necropolis on the Paracas penninsula of the Pisco Valley. Forty or more elaborately wrapped mummy bundles were found in one of the stone-lined subterranean vaults. At another site, Cahuachi in the Nazca Valley, all of the larger graves were empty but the graves of poorer or middle-class people were untouched. Again the "Huaqueros" or grave robbers have deprived the archaeologists of some valuable information.

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Unfortunately, the Nazcans did not paint life scenes on their pottery or mold portraits, buildings and activities on vessels, so we do not have the same information about their society as we do for the Mochicans. Instead, their pottery and textiles show a greater concern with religious and supernatural motifs. The pottery of the Nazca Valley is considered to be of excellent quality, while the Paracas textiles are considered among the finest in the world and exemplify the height of the art of weaving. Metallurgy, however, was not important on the south coast.

The irrigation systems of the south coast did not reach the same magnitude as those in north coast. There do not seem to have been inter-valley canals and aqueducts. The irrigation systems of the Nazca, Ica and Pisco valleys are smaller, less complex and maintain smaller areas of cultivated land. However, the crops grown were probably similar.

One of the most interesting aspects of Nazcan archaeology are the mysterious long straight lines, geometrical figures, and other markings on the ground that one can observe from the air. These markings were formed by removing the dark brown pebbles which cover the yellow sandy surface in this neighborhood. By piling them up, the exposed areas reveal patterns and designs some of which are over five thousand feet long. Some of the patterns take the form of birds and fish: others are spirals or zigzags. Radiocarbon dates for a post at the intersection of two lines indicate that some of these patterns date from about 500 A.D. What significance do these strange shapes have? One of the best explanations offered so far is that the lines were used for making astronomical observations for calendrical purposes. Another suggestion is that the lines and figures were for celestial gods to view. Whatever the explanation, the execution of such a mammoth undertaking required a large organized labor force. These patterns remain one of the most interesting mysteries of Peru's ancient history.

One might say that the Nazca culture, also, was "ripe" for a new influence from the south highlands. This new influence came in what has been termed the period of Tiahuanaco expansion, which we shall call the Expansionist Period. This is one of the most important periods in Peruvian prehistory.

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O'Neale, Lila M. Textile Periods in Ancient Peru: II Paracas Caverns and the Grand Necropolis. Publications in American Archaeology and Ethnology, Vol. 39, No. 2 (1942), plate 2, p. 195. Reprinted by permission of the University of California Press.

6. Tiahuanaco: A Highland Ceremonial Center 600 to 1000 A.C.

The "altiplano" of Peru and Bolivia stretches cold and barren around Lake Titicaca at an altitude of 12,000 to 14,000 feet. Adequate rainfall in the immediate vicinity and north of Lake Titicaca permits cultivation without irrigation. (La Paz, Bolivia has an annual rainfall of twenty-two inches. However, some form of irrigation is necessary south of the lake because the rainfall steadily decreases as one approaches northern Chile.) The high altitudes present other problems for agriculturalists, though. Corn and wheat will ripen at an altitude of 12,000 ft. but no higher. The hardy potato, a root called oca, and a very hardy grain native to Peru called quinoa are the only crops the Aymara Indians grew before the Spanish conquest. However, the bunch grass that grows at very high altitudes (at 13,000 feet and above) is seen on the high plain and provided the major source of pasture for the herds of alpacas and llamas.

Small round adobe houses dot the high plain in a scattered pattern. The population density probably has not changed very much since pre-Hispanic times. Many of the simple adobe houses have stone foundations, and if one were to inspect the individual stones closely, some of the well cut stones would give clues to the ancient past of the Aymara people who live around Lake Titicaca. For centuries the Aymaras have been robbing an ancient ceremonial site called Tiahuanaco of its stones to construct their simple houses.

The Aymara people can tell us very little of the ancient builders of Tiahuanaco, which is one of the most impressive stone masonry complexes in Peru. In fact, archaeologists cannot tell us much about the origin of Tiahuanaco, either. We must wait for more archaeological study to be done in the area. The stones lie scattered around the site mutely testifying to a people extremely skillful in architecture and stone masonry. The stone work of Tiahuanaco excels even the excellent masonry of the Incas. The stones are well cut, notched, and polished. Copper clamps were set into cut out groves to join the stones. Natural copper is found around the shores of Lake Titicaca. The ancient builders did not have to extract it from other ores; they only had to cast it into the desired shapes. The only other places that natural copper is found in the New World is around the shores of Lake Michigan.

Stone sculpture is very frequent at Tiahuanaco, including pillar-like statues (one of which is about 24 ft. tall), relief slabs and blocks, and decorative friezes on gateway. Also, both animal and human heads with tenons or blocks for wall insertion are found. The dominant motif which typifies the Tiahuanaco Classic Period is the central figure on the "Gateway of the Sun." The figure is of a human with a staff in each hand, a belt with dangling trophy heads around his waist, and large tear-like marks streaking down his face. It has been suggested by several anthropologists that the figure represents a Creator-God. The gateway originally led to a great sunken court, 195 feet by 210 feet in size. The court was once enclosed by stone walls. Huge stone columns, which once supported the walls, now lie scattered about the site. The sunken court, the walls around it, and other buildings at Tiahuanaco were made of cut and polished sandstone and basalt. Neither of these materials is immediately available at the site. The nearest source of sandstone is three miles away. Many of the stones at the site weigh as much as one hundred tons!

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A natural mound at Tiahuanaco was stone faced and terraced to a height of fifty feet, making a pyramid whose base measures 690 feet by 690 feet. The top of the pyramid served as a reservoir with a stone overflow and canal. House foundations have also been found on top of the mound.

Many of the carvings as well as buildings stand unfinished. The construction of Tiahuanaco was probably done intermittently over several hundred years. It is believed that Tiahuanaco was a great ceremonial center where people came several times a year to worship and to work on the construction of the buildings, the carvings and the courts. This is the explanation offered for the great number of unfinished carvings and buildings.

Other artifacts such as wood, bone, textiles, and feather work have not preserved well on the relatively rainy altiplano (as compared with the preservation on the dry coast). No textiles have been found but the statues give us a fair picture of the clothing of the day. Depicted are decorated head bands, waist bands, ponchos, and other articles of clothing. As in other parts of the world where preservation is poor, stone and pottery offer the most clues to the archaeologist. The pottery of Tiahuanaco is usually decorated with a painted portrayal of the "Creator-God," feline designs, snakes, and birds.

The dominant style of the "Creator-God" is found on almost the entire coast of Ancient Peru. Often the style is found fused or mixed with the local art styles, but aspects of Tiahuanaco such as figures with tear-like streaks on their faces and the rigid human figures of the God are very frequent in coastal textiles and pottery. However, the monolithic stone architecture typical of Tiahuanaco has not been uncovered on the coast. This spread of Tiahuanaco style is called the Tiahuanaco Expansion and is dated between 600 A.D. and 1000 A.D. The exact nature of this expansion has not been determined. But, because components of the Tiahuanaco complex are so widely distributed and so readily recognizable, some form of political expansion is certain.

Not all areas of ancient Peru fell under Tiahuanaco influence. The far north coast and the far north highlands probably were not affected. The unity under Tiahuanaco was relatively short lived, and soon reformulations of both Tiahuanaco and the local styles emerged in new mixed forms. Many of these reformulations resulted in the large urban centers. Tiahuanaco provided the stimuli necessary for urbanization to emerge.

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7. The Empire of Chimu

The last epoc of Peruvian prehistory we are going to discuss is what has been called the Imperialist Period. The period is generally dated from 1000 A. D. to the arrival of the Spanish in 1532 A. D. The two greatest empires of the period are the Chimu Empire of the north coast and the Inca. The period marks the time in Andean prehistory when true urbanization appeared with such cities as Chan Chan on the north Coast and Cuzco in the Inca Empire. Chan Chan was the capital of the Chimu Empire and it was conquered by the Inca only sixty or seventy years before the Spanish arrived. The Chimu territory, just before it was conquered by the Inca, extended six hundred miles from the modern boundary of Peru and Ecuador, south almost to Lima. But when the Spanish arrived, they found a Chimu chief living in the capital city of Chan Chan with only a handful of people. The Spanish were impressed, as are visitors today, by the city's immense size. Chan Chan, the largest pre-Hispanic urban center known, could truly be called a metropolitan city. It covers eleven square miles, and, in 1450 A. D., when it was conquered by the Incas, it had an estimated population of 50,000 people.

The city was divided into eleven huge living compounds, each surrounded by walls twenty-five feet high. Most of the walls are still standing but the buildings have become heaps of adobe rubble. These buildings were once administrative centers, dwellings, huge store-houses, and palaces. The city of Chan Chan was well planned and laid out in an orderly fashion. The eleven living compounds were almost identical in design. All are rectangular units, containing planned groups of dwellings enclosed in massive walls. Some of the buildings are more elaborate with richly decorated walls as well as courts and mounds. These elaborate buildings are believed to have been used by the ruling class and the cult centers.

Chan Chan is located in the Moche Valley which, as you will remember, we called, "The Land Where it Never Rains." For a city of some 50,000 people to live in this dry, rainless country, the effective use of the water supply was all important. The city was supplied with water by an intricate system of canals and aqueducts. One, the Mochica Canal, is still in use. The La Cumbre Canal is estimated to have been seventy-five miles long and brought water from the headwaters of the Chicama River to the fields of Chan Chan. The system of canals and aqueducts transformed the desert into a fertile, productive land. Chan Chan was supplied with food by the many irrigated fields surrounding it. Near the fields and the major canals and aqueducts were small towns. The people of these settlements worked the fields, maintained the canals, and transported produce to the capital city.

When we discussed the ancestors of the Chimu, the Mochicans, we said they did not have organized, planned towns. In the four hundred years of the Expansionist Period, however, a strong organizing and urbanizing influence came from the south highlands and affected the entire coast. There is a break in the art styles of the north coast between the Mochica culture (200-600 A. D.) and the Chimu (about 1200 A. D. to about 1460 A. D.). There is also a gap in time of some five or six hundred years. During this time Tiahuanaco influence can be seen in pottery, weaving and metallurgy. Also with the Tiahuanaco expansion came the necessary social organization that made urbanization possible.

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Chan Chan, during its height in the fourteenth century, probably resembled a large urban center of the Old World of the same period. There were differences, of course. Transportation was primarily by human carriers as the wheel had not been invented in the New World and the llama will only carry a maximum load of about sixty-five pounds. The market would have been different, also. People, of course, would have been speaking the Chimu language and they would have been dressed quite differently. Also, the produce for trade would have been entirely different, potatoes, yucca, corn, squash, beans, and chile peppers would have been the main items. For meat, there would have been fish, guinea pigs, and maybe a little game. Wheat, barley, sheep, goats, and cattle, of course, were unknown until the Spanish arrived. The Chan Chan market would have had great quantities of goods produced in the area: textiles, pottery, and, especially, metal objects. The Chimu had perfected means of mass production; for example, they turned out great quantities of pottery by using molds. The mold-made pottery was polished redware or commonly smoked blackware with the stirrup-spout as the domiant shape. Painting was rare, but decoration was achieved by modeling, pressed relief, or incision (cutting designs into the pot before it is fired).

Woven fabrics were produced in quantity, also, but the elaborate weaving of previous periods was less frequent. Sheer gauze-like material, brocades, and pattern weaves were abundant. Embroidery was common but it was applied to limited areas or to figure outline. Border fringes were typical although needle knitting, which was practiced by previous cultures, had been abandoned. Elaborate feather work was typical, too.

Metal work is the one craft that was more technically advanced in this period. Many of the other crafts experienced a decline in both popularity and excellence. Bronze, or the alloy of tin and copper, was known, and the casting of copper became widespread for the first time. Gold, silver, copper, and bronze were all used in making such ornaments as masks. earrings, beads, crowns, and breastplates. Goblets, bowls, and plates were made of silver and gold,also. Fine incised design work was popular for all of these luxury items for the nobility as well as intricate mosaic insets of beads, seeds or stones. If we wanted to name the one craft that the Chimu developed to excellence, improving on the techniques that they inherited from their ancestors, the Mochicans, it would have to be metallurgy.

After the conquest of the Chimu, the Incas so highly prized Chimu craftsmen that they moved several to Cuzco to work gold, copper, bronze, and silver, to make pottery, and to weave for the royal court. In fact, quantity production is what characterizes all the crafts of this period.

We can only guess that the Incas learned many other things from the Chimu besides new techniques of metallurgy. They could have learned new governmental and ruling techniques from these sophisticated urbanites as well. Whatever they learned, the Incas considered Chan Chan too powerful to let it remain intact. It is speculated that they depopulated Chan Chan and destroyed many of the nearby towns. A great number of the cultivated fields reverted back to desert waste and the magnificent city of Chan Chan began to crumble. Sixty years after the conquest the Spaniards found the region sparsely populated and fallen into ruin. It has never returned to its original magnificence.

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a. Your teacher will show you some slides. What is pictured in these slides? What additional data do the slides give us about the Empire of Chimu?

Slide (1)

Slide (2)

Slide (3)

Slide (4)

Slide (5)

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b. Think very carefully about the following questions. How would you answer them?

Is the city of Chan Chan different from cities in earlier periods in Peru? How is it different?

How is the city of Chan Chan similar to or different from a Third Dynasty city in Mesopotamia? How are they similar to or different from a modern American city?

What were some of the crafts developed to excellence by the Chimu?

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What effects do you think mass production had on the Chimu economy?

List what you think were the primary resources available to the Chimu people. In what ways did the Chimu improve their use of available resources over the ways earlier cultures had used their resources?

What can you say about Chimu social life and political structure? How are these similar to or different from earlier Peruvian cultures?

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8. A STORY OF A VISIT TO THE LAST INCA, TITU CUSI[1]

In 1565, Don Diego Rodriguez de Figueroa left Cuzco with letters of permission from Titu Cusi and the last Inca, to enter his sanctuary at Vitcos. Rodriguez was Titu Cusi's first Spanish visitor, and he was acting under the orders of the Viceroy to attempt to convert Titu Cusi to Christianity and persuade him to leave Vilcabamba, his sanctuary.

The survivors of the Inca dynasty had been in seclusion for thirty years, taking great pains to keep all visitors out. Rodriguez' mission was an extremely important one. The Spanish had broken the power of the Empire and they now wanted to persuade the last of the royal family to come out of hiding and move to Cuzco.

The following is Rodriguez' diary as trandlated by the English historian Sir Clements Markham.

"I left Cuzco on the 8th of April 1565, after having received letters from Judge Matienzo to the Inca Titu Cusi Yupanqui, with leave to make an entrance, after having offered my services to go by that route. I went to sleep at Ollantay-tambo, where they gave me seven Indian carriers to show me the way." He then went over the Pass of Panticalla and down the Lucumayo river to an ancient suspension bridge.

"On the 5th day of May ten (Inca) captains came to the bridge, richly dressed with diadems of plumes, and lances in their hands which they brandished, and wearing masks on their faces. They came to the passage of the bridge where I was, and asked me if I was the man who had the audacity to want to come and speak to the Inca. I said yes. They replied that I could not fail to be much afraid, and if I felt fear I could not come, because the Inca was a great enemy of cowards. To this I answered that if he was an elephant or a giant I might be afraid, but as he was a man like myself I had no fear, but I would offer him respect. If he would let me enter under his word, I would do so, for I knew that he would keep it." Apparently he did not like the bridge or they were afraid to let him use it, because he says that, "On the 6th day of May I crossed the river in a basket travelling along a cable, and seven Indians came with me. The ten Indians of the Inca helped me to cross, and accompanied me. That night I slept at the top of a snowy mountain. . . .

"I set out on the 12th of May and went on to Vitcos where the seven Spaniards killed the Inca, and their heads are exposed. The Indians told me that those Spaniards had killed him to raise the land, and that they determined to kill him while playing la herradura (horse-shoe quoits). One Mendez did it with four or five stabs behind him until he killed him; and to Titu Cusi, the Inca who is now, they would havd done the same, but he escaped down some rocks, which they showed me. If they had wanted to kill some Indians they could have done so, but their object was to kill the Inca. Then many Indians and captains assembled, who seized the Spaniards and killed them.". . . .

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1. Bingham, Hiram. Lost City of the Incas (New York: Atheneum, 1963), pp. 55-61, abridged. Copyright, 1948 by Hiram Bingham, used by permission of Duell, Sloan and Pearce.

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Rodriguez continues: "On the 13th of May I sent two of my Indians to the Inca with some refreshments of raisins, figs, and other things. The Inca received them well, and gave them two baskets of peanuts which they were to take to me, with a message that next day he would arrive, so that we should see each other soon, and that I need not travel further.

"On the 14th of May the Indians of Bambacona had made me a large house on a strong height surrounded by entrenchments. Below were the houses of the inhabitants. The road by which he was to come was very clean and passed over a great plain. The three hundred Indians with their lances, and others from the surrounding country, had made a great theatre for the Inca, of red clay. They were awaiting his arrival, and wished me to go out to meet him. They told me that the people of the village would wait on the plain, and that they would show me a place where they had brought two loads of straw, half a stone's throw, and see the entry of the Inca, and not to move until the Inca sent for me.

"Many lances were drawn up on a hill, and messengers arrived to say that the Inca was coming. Presently the escort of the Inca began to appear." Rodriguez now does us the great service of describing as accurately as he can, the formal dress deemed appropriate for the Emperors of Peru in the days of Inca power and majesty. "The Inca came in front of all, with a head-dress of plumes of many colours, a silver plate on his breast, a golden shield in one hand, and a lance all of gold. He wore garters of feathers and fastened to them were small wooden bells. On his head was a diadem and another around the neck. In one hand he had a gilded dagger, and he came in a mask of several colours." From this description, the Spanish artists of the XVI and XVII Centuries drew their pictures of Inca Emperors they had never seen. Copies may be seen in Cuzco.

"Arriving on the plateau where the places of the people were, and his seat was set up, and mine, he gazed where the sun was, making a sort of reverence with his hand, which they call mucha, (a kiss) and then went to his seat. There came with him a mestizo with a shield and sword, and in a Spanish dress, a very old cloak. Presently he turned his eyes in the direction where I was, and I took off my hat. The Indians did not notice this. I held up an image of Our Lady which I carried in my bosom, and though the Indians saw it, they took no notice. Then two orejones (big-ears, nobles) came near the Inca with two halberds, dressed in diadems of plumes with much adornment of gold and silver. These made obeisance and reverence to the sun and then to the Inca. All the rest were standing near his seat, encircling him in good order. Presently the governor came, named Yamqui Mayta, with sixty or seventy attendants with their silver plates, lances, belts of gold and silver, the same dresses following; and all made obeisance first to the sun and then to the Inca, saying, 'Child of the Sun thou art the child of the day.' Then they took up their position round the Inca. Then another captain entered, named Vilcapari Guaman, with about thirty Indians bearing lances adorned with feathers of many colours. Then twenty men with axes, making reverence to the sun like the rest. All wore masks of different colours, which they put before their faces. Next a little Indian entered who, after making reverences to the sun and the Inca, came towards me, brandishing a lance, and raising it with great audacity. He then began to cry out in Spanish "Get out! and to menace me with his lance. Next another captain entered named Cusi Puma, with about fifty archers, who are Antis eating human flesh. Presently all these warriors took off their plumes of feathers and put down their lances. With their daggers of bronze and their shields of silver, or leather, or of feathers, each one came to do reverence to the Inca who was seated, and then returned to their places.

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"Presently he sent for me, and passing through that multitude of Indians, I took off my hat and made a speech to him. I said that I had come from Cuzco solely to know and serve him. If I wore a sword and dagger it was to serve him with them and not to offend him. To this he answered that it was for men to bear arms and not for women or cowards, and he did not, therefore, hold me in more esteem for that. But he said he was pleased at the trouble I had taken to come from such a distance to him, adding that he had come forty leagues only to see and converse with me. Then he gave me a cup of chicha, asking me to drink it for his service. I drank a quarter of it, and then began to make faces and wipe my mouth with a handkerchief. He began to laugh, understanding that I did not know that liquor."

"The Inca was a man of forty years of age, of middle height, and with some marks of smallpox on his face. His mien rather severe and manly. He wore a shirt of blue damask, and a mantle of very fine cloth. He is served on silver, and there are also twenty or thirty good-looking women, waiting behind him. He sent for me to eat where he was with his women and his governor. The food consisted of maize, potatoes, small beans, and the other products of the country, except that there was very little meat, and what there was consisted of venison, fowls, macaws, and monkeys, both boiled and roasted. When night came on he asked me whether I had made the acquaintance of his captains. I replied in the affirmative and he then took leave of me. He went to the house that had been prepared for him, in exactly the same order as when he arrived, with music of silver flutes and trumpets. That night there was a guard of a hundred Indians who were divided into watches, and flutes and drums were played to call each watch. They placed a guard of fifteen Indians over me with their lances. I being in a house outside the village. I calculate that all the Indians who came with the Inca, and those of the village numbered 450.

In the morning of the 15th of May the Inca sent for me to his house, for it was raining. The greater part of his troops were seated round a large fire. The Inca was seated, dressed in a shirt of crimson velvet, with a mantle of the same. All his captains had taken off the masks they wore on the day before. . . .

"As daylight was now appearing, and they had all drunk freely, I asked permission of the Inca to return to my lodging and get something to eat, and that another day I would state frankly what I had come for. So I departed, leaving them to boast loudly, but all much disturbed in their minds.

"Soon afterwards they sent me a sheep of Castille, (evidently, the result of a successful raid on a Spanish colonial sheep ranch), many fowls and partridges, and other food which their country produces. To those who brought them I gave some trinkets, needles, and other Spanish things. Presently the Inca sent for me. I went there, and was there until night, without a word being spoken, when I returned to my lodging. The reason for this appeared to be that too much chicha had been drunk." Even today the Quichuas are noticeably not talkative after consuming much chicha.

Rodriguez had brought presents for the Inca, silver bracelets, crystals, and pearls. With the Inca's permission, he was permitted to deliver a discourse on Christianity and suggested the propriety of setting up crosses as evidence of faith. This pleased the Inca not at all and he said he had a good mind to order the intruder killed.

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"From the top of a rising ground," says Rodriguez, "I saw the festivities made for the Inca, and heard the songs. The dances were war dances with spears in their hands, throwing them from one to another. I believe that they did such things by reason of the quantity of chicha they had drunk.

"The Inca sent for me late in the afternoon and I went against my will. He told me to sit down and began to boast, saying that he could himself kill fifty Spaniards and that he was going to have all the Spaniards in the kingdom put to death. He took a lance in his hand and a shield and began to act a valiant man, shouting 'Go at once and bring me all the people that are behind those mountains; for I want to go and fight the Spaniards and to kill them all, and I want the wild Indians to eat them.' "

"Then there marched up about 600 or 700 Antis Indians, all with bows and arrows, clubs and axes. They advanced in good order, making reverence to the sun and to the Inca and took their positions. Then the Inca again began to brandish his lance and said that he could raise all the Indians in Peru, he had only to give the order and they would fly to arms. Then all those Antis made an offer to the Inca that, if he wished it, they would eat me raw. They said to him, "What are you doing with this little bearded one here, who is trying to deceive you? It is better that we should eat him at once.' Then two renegade Inca oregones came straight to me with spears in their hands, flourishing their weapons and saying, 'The bearded ones! Our enemies.' I laughed at this, but at the same time commended myself to God. I asked the Inca to have mercy and protect me, and so he delivered me from them, and hid me until morning." Apparently Titu Cusi was a little bit afraid his nobles might go too far in their desire to take revenge on one of the hated Spaniards.

"On the morning of the 16th of May the Inca sent for me to come to the open square which he entered in the same order as before, and as I came in I saluted the Inca and sat down. The Inca and all the captains then began to laugh heartily at what had happened the day before, and they asked me what I thought of yesterday's festival. I replied that I thought it rather exceptional, and that to have treated me so was wrong, seeing that I had come on serious business. They explained that it was only their fun, and that they could not give it up. . . ."

Apparently to please his visitor, Titu Cusi permitted a cross to be set up near where he was staying. Then Rodriguez told Titu Cusi of the might and power of Charles V of Spain.

"To this he replies that the power of the king was great, and though he had so many nations, as well black men as Moors, subject to him, yet he, the Inca, like Manco Inca his father before him, knew how to defend himself in those mountains. . . Presently he sent to Vilcapampa for more men." The first lot of soldiers had apparently come up the Pampaconas valley from the warm jungles and were savages with bows and arrows. Now, to impress Rodriguez, Titu Cusi sent to the ancient sanctuary, his other capital called Vilcapampa, for some highland warriors.

"On the 25th of May one of his generals arrived with 300 men, armed with lances, who entered the open place where the rest were drawn up, and made obeisance to the Sun and to the Inca. Then a hundred captains of those who came

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from Vilcapampa went to where Yamqui Mayta was standing and asked why he had consented to have the cross planted in their land, seeing that it had not been set up in the time of Manco Inca. Why then was it there now? If I had persuaded the Inca to do this, they intended to kill me. The Inca replied that it was done by his order, and that it was well that they should accept the cross of the creator of all things. Having received this answer they went to their seats, and the festival proceeded."

Rodriguez was a man of courage and profound convictions and carried himself with so much bravery and tact that he succeeded to a large extent in arousing the Inca's admiration and respect and made him almost willing to assent to the proposal that he follow in the footsteps of Sayri Tupac, leaving Vitcos and going to Yucay to live in comfort, surrounded with all due honor.

Sufficient progress was reported by Rodriguez to encourage another ambassador, accompanied by thirty Spanish soldiers and a number of Indian guards, to reach the key bridge at Chuquichaca. The sight of this armed force, which included twenty harquebusiers, so alarmed Titu Cusi, however, that he caused the bridge to be torn down, sent Rodriguez and all the Spanish envoys back to Cuzco and retired to Vitcos.

Nevertheless he appears to have kept as his Secretary, a mestizo, one Martin Pando, who probably spoke both Spanish and Quichua.

Martin Pando seems to have lived in Vitcos or the neighboring village of Puquiura for the next five years and to have won the confidence of Titu Cusi to such an extent that the Inca decided to carry on a correspondence with the Spanish authorities. It may have been due to his influence that about three years later, Titu Cusi apparently became convinced that he might be better off if he adopted the religion of the conquerors.

Mestizo--is a person that is half Indian and half Spanish.
La herradura--is a game much like horseshoes.
Orejones--literally means big ears but refers to the very large ear plugs (earrings) that the Indians of nobility wore to denote their status. The ear plugs were probably quite like the ones shown in Slide No. 125, which are ear plugs of the Mochica (coastal) period.
The Antis--There is a sentence that reads "the Antis eating human flesh. . ." The Antis were a fierce jungle tribe that were cannabalistic. The Antis formed a loyal part of the last Inca's army.
Chicha--is a beer made of corn. It is still made and consumed today in the Andes as well as Colombia and Ecuador.
Quechua--was the official language of the Inca Empire. The Inca imposed this language over all conquered areas. Today there are an estimated six million Indians in the Andes who speak Quechua and Aymara (another indigenous language of the Andes spoken primarily in the Titicaca basin).
Halberds--are shafted axe-like weapons.
Harquebusiers--are riflemen.

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The reading is taken from Hiram Bingham's account of his 1911 discovery of Machu Picchu. Mr. Bingham believed that he had discovered the last royal city of the Inca, the capital city of Vilcabamba. But Machu Picchu appears to have been only a small fortress town of no more than 150 structures designed to guard the valley that led into the Eastern jungles. It is very likely that it was abandoned shortly after the Spanish conquest. The archaeological remains do not indicate that it was the lost capital city. It was known that Titu Cusi had a fair sized army, many captured horses, guns, suits of armor as well as a city of considerable size. Machu Picchu could only have been a town of some three or four hundred at the very most, and, oddly enough, the burials contained mostly skeletons of females. Very few males were buried at Machu Picchu. The "Lost City" of the Inca is still undiscovered; it is, perhaps, somewhere under the thick jungle growth of the eastern slopes of the Andes.

Answer the following questions pertaining to the reading "A Story of a Visit to the Last Inca, Titu Cusi."

a. What indicates to you that the Inca was a very important man? Describe below.

b. List the arts and crafts that were present in the Inca Empire. Beside each one you list, indicate the word or words in the article which gave you the clue.

Arts and Crafts	Clues

c. What foods were served? Where (geographically) did these foods come from?

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d. Do you think trading was very important in the Inca Empire? What is your evidence?

e. Do the Incas appear to have come from different regions of the country? How do you know?

f. Do you think the Inca Empire was well-organized? On what data are you basing your opinion?

g. What do you think of the Inca as a person?

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9. The Inca Agricultural Calendar[1]

The Indians were above all tillers of the soil; the calendar of production and harvest was established in the following way, in terms of cultivation.[2]

The first month of the year was always reckoned from December 21, with reference to the moon, of whose importance we have already spoken. Even the name of the month was 'moon'--quilla in Quechua. The Indians earthed up the potatoes, maize and oca, and cleaned the fields. They went fishing and with slings in their hands helped the children to drive the beasts away from the fields; the women helped too by beating on a drum. As it rains frequently at this time of the year, the family was obliged to remain indoors for long periods, where they busied themselves with caring for their clothes and sanctifying themselves by prayer, penitence and sacrifices. It was a time of contemplation and preparation. Food consisted of preserved provisions taken from the stone jars, maize and early potatoes, herbs and fruits, and fish if possible.

The second month of the year, approximately February, was the month of hope, for the harvest was near. Breaking new ground was easy in soil moistened by the rains. Everyone tried to increase the area of cultivation with the help of his neighbours, and roads and canals were repaired.

The third month was that of ripening. The maize came up and the children were hard put to it to defend the crop against the birds. On the coast fish was particularly plentiful, and dried fish arrived along the trade routes to the heart of the sierra.

April, the fourth month, brought an abundance of flowers and fruits, and homage to the sovereign, whose feast this was.

May, the fifth month, was justly regarded as the most important month of the year. The family harvested maize, pulled off the leaves, shelled the ears, sorted the corn, and providently set aside the seed-corn. This tender maize was good to eat, but no good for the preparation of chicha. Then they had to gather herbs and dry them, and also prepare charqui, for May was the hunting season.

In June it was the turn of the potatoes and oca to be dug from the ground and turned into chuno. In between whiles they gathered quinua, repaired their dwellings, roads and canals. Inspectors came round to see that each family was building up the necessary reserves of food, and prepared statistics of the population and of stocks of all kinds.

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1. Reprinted by permission of The Macmillan Company from Daily Life in Peru by Louis Baudin. Chapter 13, "Economic Life, Agriculture and Fishing," pp. 218-220. Copyright © 1962 by George Allen and Unwin, Ltd.
2. The calendar we have described is for the most part borrowed from Poma de Ayala: Nueva Coronica.
   Most of the Indians in the Inca Empire existed primarily on the crops grown in their fields. They also ate some meat and fish. On the Pacific coast and on the shores of Lake Titicaca, however, the staple food was fish. Hooks, nets, and traps were used to catch the fish. At night, lanterns were used to attract fish so the fish could be shot with arrows.

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The harvesting of plants took place in July, and then the Indians worked on the lands of the Inca and the Sun. They spread manure and began to plough their own strips of ground and to sow maize in them. The redivision of communal lands took place at this time.

In August potatoes as well as maize had to be planted. Prayers and sacrifices took place to ensure the favour of the gods for future harvests. Quantities of vegetables were gathered, also salt and pepper.

The sowing of seed went on in September, and during this month the Empress' feast was celebrated. When there was a drought they had recourse to religious ceremonies to bring it to an end.

October was a month of preparation. Seeds were watered, wood collected, ropes woven and thatch repaired. If rain was still delayed, prayers became more pressing and offerings more numerous.

In November and December, months dedicated respectively to the dead and the Sun, they had to live on their food reserves. But during December there was plenty of fruit. Before the end of the year potatoes, ocas and vegetables were again sown.

The land which was the scene of the agricultural activities we have just described belonged to the agrarian community. But its area was little by little extended so as to match the increase in the population, at first spontaneously by individual initiative, and then in the time of the Incas by State intervention. In both cases the procedure was the same. Work was communally carried out, and fertilizers were used.

Folk-lore has handed down this prayer from Inca times:

'O Creator! May the subjects of the Inca, the peoples in subjection to him, and his servants, rest in safety and peace in the reign of thy son, the Inca, whom thou hast given us as king. Whilst his reign lasts, may thy people multiply and be kept safe, may it be for them an age of prosperity, may everything increase, fields, men, and beasts, and guide always with thy hand the monarch to whom thou hast given birth, O Creator!'

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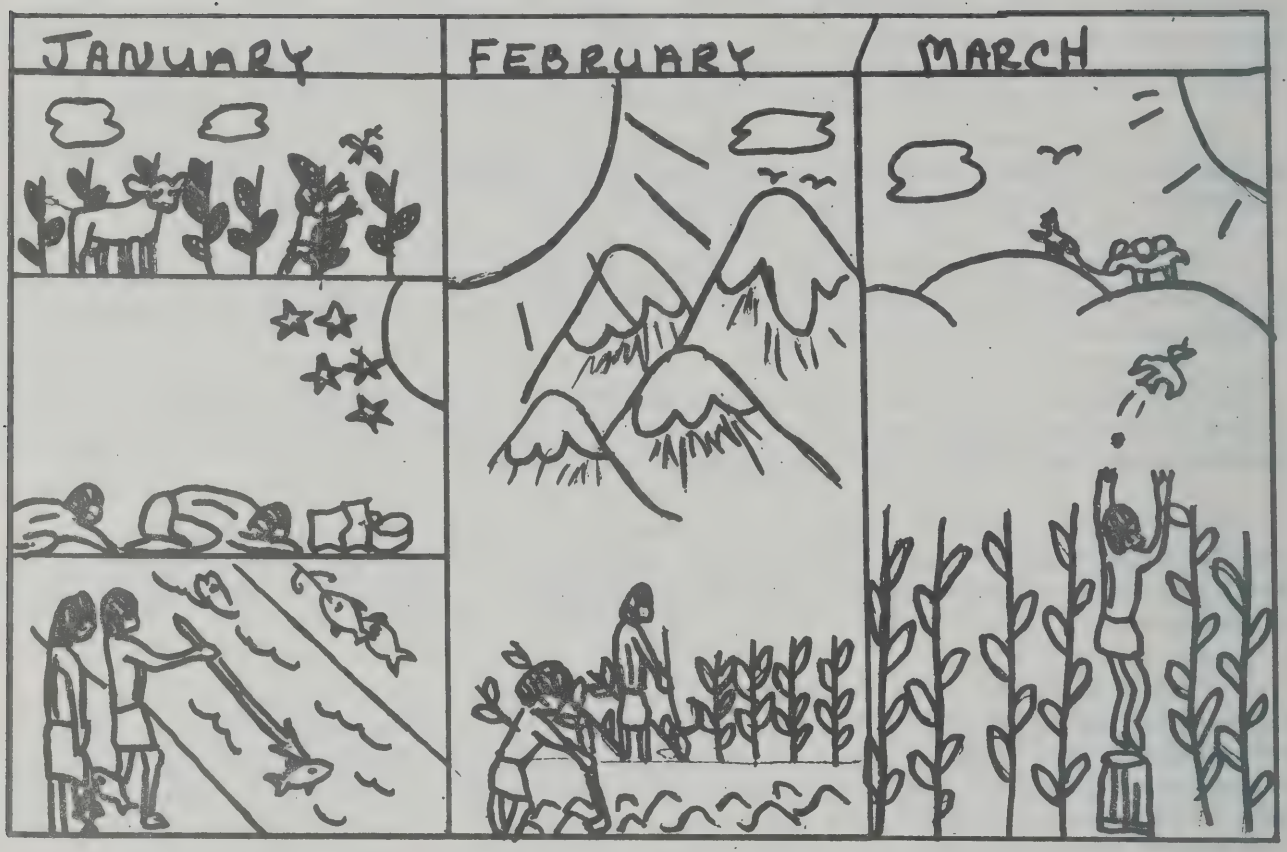
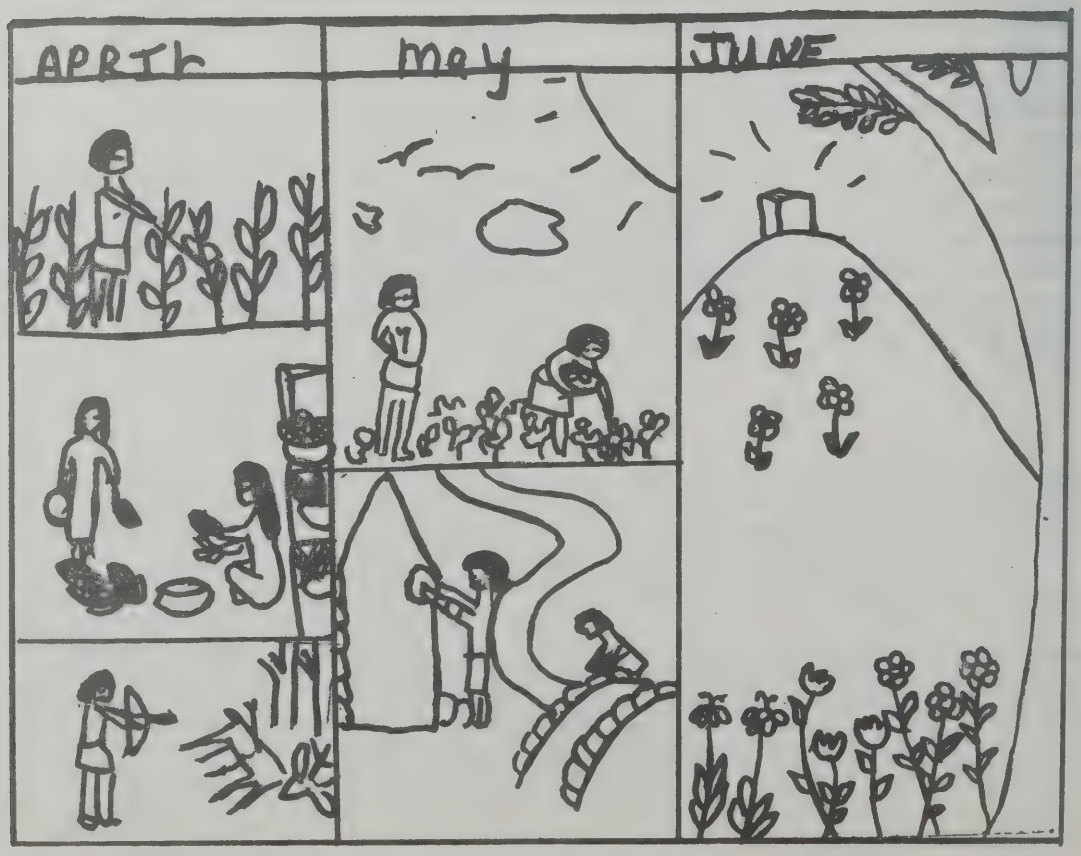
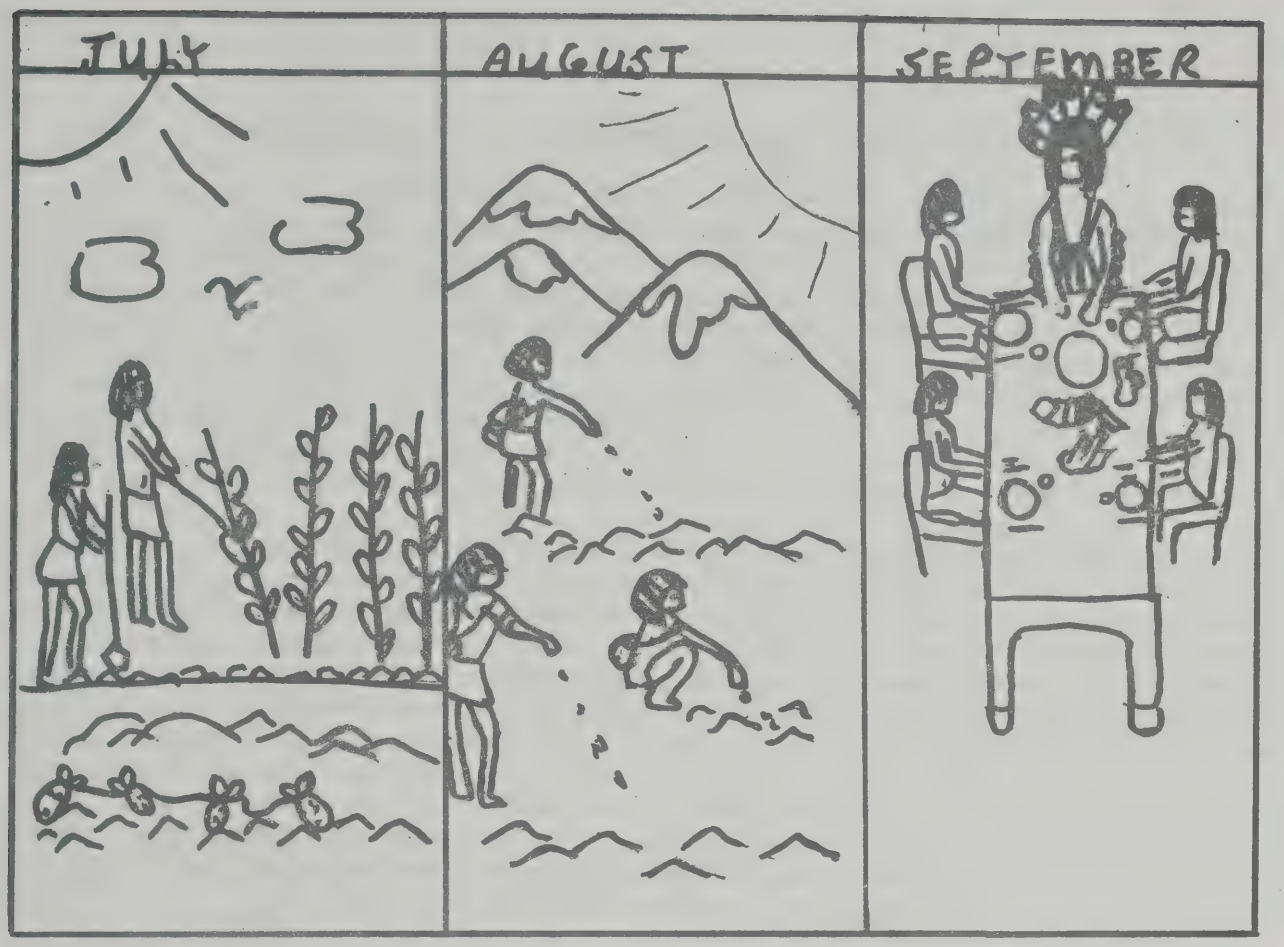
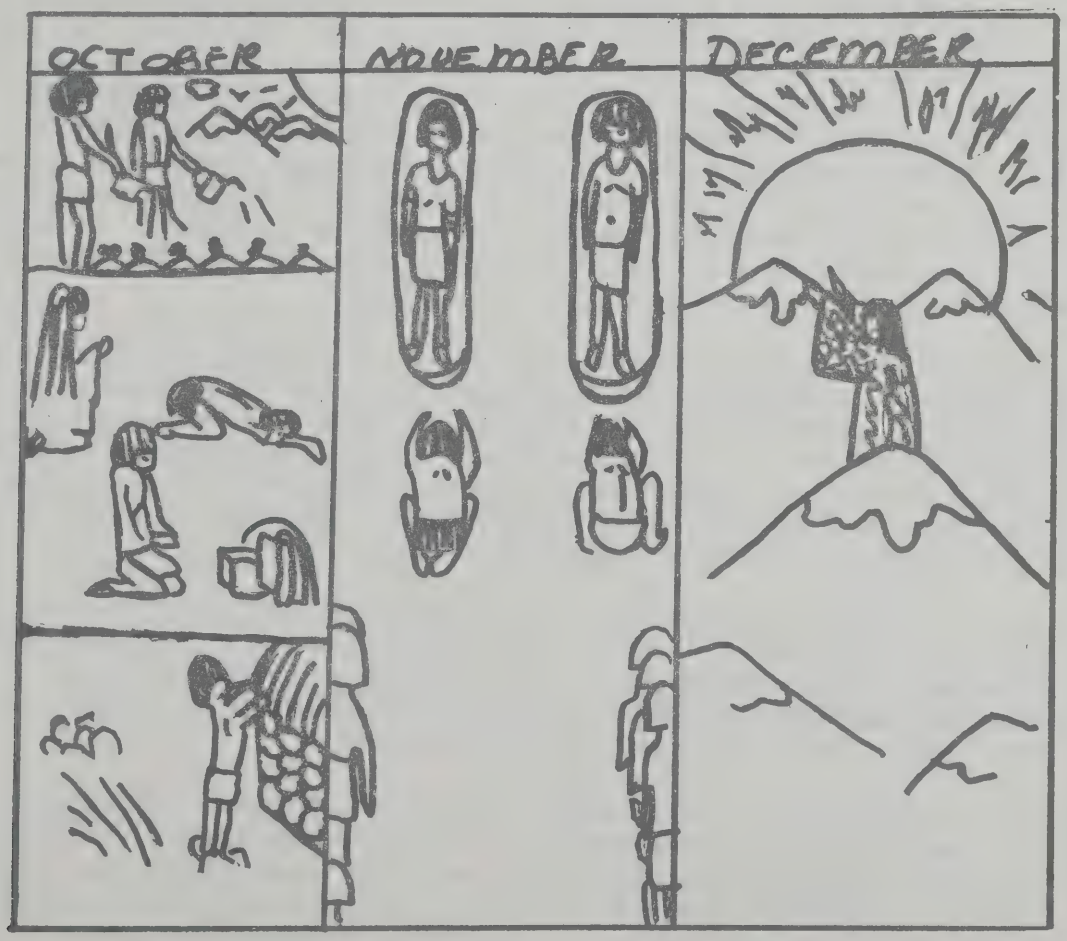
THE INCA CALENDAR









- Priscilla Patey
Springfield

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Daily Labor

Let us imagine ourselves in the days of the Incas and follow the Indian as he sets out to work one fine morning in July. An immutable order provided that the lands of the Inca and the Sun came before all others. Nothing could be more just. That day, at dawn, a trumpeter climbed the slopes of the hill overlooking the village and blew into his conch shell to call the inhabitants together. They all came, with their wives, gathered in their family groups, spade on shoulder and wearing holiday clothes. To serve the god of light or his representative on earth was not work, it was a pleasure. Everyone knew, moreover, that the Emperor himself each year at this time went to the field of Kolkampata, sacred to the worship of the Sun, and ploughed the soil in homage to his creator.

Once the little party had arrived, officials divided the tasks amongst the group leaders, and they amongst their individual members, assigning to each of them a long and narrow strip of land so that the leader had only to move backwards in a straight line and all the other men in the group followed parallel to him. This system, like that of sharing portions between the members of the community, had the advantage of fixing responsibility. He who finished first did not help the others, 'otherwise,' explains a legal expert, 'they would have done nothing.' In fact, no one finished before or after the others, for the Indians placed themselves in line, each on his strip of land, with his wife in front of him. They began to sing in chorus and worked back evenly in line, matching the rhythm of their actions to the song. The refrain which regulated the general speed was 'victory'--haylli--victory over nature, over evil spirits, over famine and death.

The instrument of toil was a very simple tool which was used to turn the earth, the taklla, a piece of hard wood slightly more than 3 feet long, having, in Ecuador, a groove towards the centre so that the left hand could more easily hold it. In Peru a second piece of hard wood, bent round, was bound near the centre. This was held by the right hand whilst the left held the first piece of wood upright. In both models, just above the tapering end, were fixed two small crossed sticks on which the worker placed the right foot to drive the stake into the ground like a spade. However this was considered to be inferior to the taklla, for it dug out large lumps of soil, whilst the taklla crumbled it. Poma de Ayala shows a delightful drawing of Adam digging with a taklla.

To till the soil, the Indian lifted this tool and drove it with all his strength into the ground, then he leaned on it with his foot and added the pressure of his arms backwards and forwards so as to break up the soil. His wife picked up the stones and broke up the sod with a large stone. The tilling took the form of a series of holes into which the seed was thrown, and there was no continuous furrow. After making a series of these broken parallel lines, the group of workers dug another series of identical lines at right angles to the first.

Instead of two people, there were sometimes three, two men and a woman, so as to break the soil up more deeply. The presence of the woman had not only an economic but a magical significance. The earth was considered to be feminine, she was the foster-mother, and Indian women were supposed to be in closer contact with her than their fathers or husbands.

Tools varied according to the country. The Araucans used a taklla, shaped like a trident, and a perforated stone attached to the handle gave it extra weight. In the Chiloe islands, two Indians operated a tool, one drove it into the ground, the other raised the embedded point with a stake, thus levering up a huge sod.

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For earthing up potatoes, the farmer used a bronze adze with a curved wooden handle.

After working on the lands of the Inca and the Sun, the Indians prepared the land of those who were unable to work on their own, of whom we have already spoken. For this they wore their working clothes and were supervised by their officials. But when they finally came to their own plots, they worked as they pleased. They always began by carefully marking out their domain, placing stones or planting cactus; then they decided the order they would follow in carrying out the work.

To watch over their fields, they had a very practical arrangement: they put certain stones in charge. Since everything on earth was living, especially beneficent rocks fulfilled this mission best. They were called huancas, and they survive to this day in a few places. At Piruro, in the province of Huanuco, a block of stone has been from time immemorial the guardian of the fields, and also of the animals which it protects from the thunderbolt. To win favour, the Indians adorn the rock with wild flowers and water it with chicha. The existence of these silent sentinels, unexacting and alleged to be efficient, was recorded by the Spanish missionaries in their search for idols.

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a. What crops did the Indians in the highlands grow?

b. How did the religion of the people fit in with their agricultural tasks? Why did they feel religion was important to the successful growth of their crops? Give examples.

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c. Do you think the daily labor served any functions besides providing for the need for food? What?

d. What kinds of tools did the Indians use?

e. What evidences did you find in the readings of the national government taking an interest in the Indians and what they were doing?

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10. What happened to the Incas when the Spanish came? Read and find out.

THE INCA EMPIRE WHEN THE SPANISH ARRIVED

The Inca Empire was at its zenith for ninety years between 1442 and 1532. During this period the Inca conquered and controlled a land area approximately the size of two Texases. Population estimates for the Pre-Spanish Central Andes range from three to six million. It is interesting to note that the first Spanish census taken in about 1571 gives a total of 1,500,000 Indians. This may indicate that the population of Peru was reduced by either a two-to-one or a four-to-one ratio during the years of struggle.

The Incas ruled over possibly as many as eighty-five provinces where as many as seven hundred dialects were listed by early chroniclers. Three languages have survived and are spoken today in the Central Andes: Quechua (which was the official language of the Empire), Aymara, and Uru. Today there are an estimated six million Indians in Peru and Bolivia who speak Quechua and Aymara. It is difficult to estimate how many different languages were spoken in the Andes during the height of the Inca Period, but twenty to thirty distinct languages would be a conservative guess.

Each time a province was conquered a rough census was taken and a relief map was made of clay. If a newly conquered province became rebellious, part of the population was moved to a new locality where they were placed under Inca administrators. In this manner the Incas colonized new areas and disrupted the old political systems of the people they conquered. The Inca ruling house also married into newly conquered ruling families. They often sent the sons of conquered kings to Cuzco for a proper Inca education. After growing up in Cuzco, the sons usually returned to their provinces loyal Inca subjects and administrators.

The Incas perpetrated what has become to be known in history as "The Great Lie" of the Inca Empire. Once they had conquered a region, the subjugated people were taught that the Supreme Inca was the Son of the Sun and therefore a god. The Sun in turn served the great God, the Creator, who had created the Inca people as his chosen people. The Incas believed and taught that before they were created, there was no other civilization in the world. They viewed their conquest of the barbarous world as the will of their Creator-god.

Usually a propaganda campaign pointing out the benefits of Inca rule preceded any military action and missionaries attempted to make converts for official Sun worship. If these measures proved unsuccessful, the army entered in mass formations of eight to ten thousand soldiers and conquered by siege, cutting off supplies, destroying water canals, and staging expertly led pitched battles. The army was well organized and discipline was severe. It is estimated that one-tenth of the population was in the army.

Chance played a major role in the conquest of Peru. Francisco Pizarro and his band of one hundred and seventy-seven soldiers of fortune reached Peruvian shores just as the Inca Empire was being torn apart by civil war. The Inca ruler had died without naming an heir to the throne and his two eldest sons were engaged in a bitter struggle for control of the vast Empire. The Spanish arrived at the most opportune moment in history. The Empire had fallen into a state of disorder and confusion, and governmental administration had broken down in many regions.

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The Spaniards seized the opportunity to play one brother against the other by promising to aid both sides! The conquest of Peru was accomplished with the deaths of both of the Inca brothers. Francisco Pizarro placed a weak, young Inca ruler on the throne, and so began another era in the history of Peru.

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11. Answer the following questions, illustrating your answers with examples from the data:

    a. What were some of the goods and services that were produced in Peru in Inca times? What resources were used in producing them?

    b. Where was power placed in Inca society? How was authority enforced?

    c. What can you say about Inca society?

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d. How did the Incas transmit ideas and transactions to fellow Incas, to the people with whom they came in contact, and to subsequent generations? What is your evidence?

e. What can you say about the Inca value system? Be specific, and give examples.

f. What do you think were the major achievements of the Incas? List the attributes and accomplishments which mark Inca culture as a civilization.

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12. Write several paragraphs comparing some aspect(s) of Inca culture with aspect(s) of Sumerian culture.

How do you explain the differences and similarities between the two ways of life?

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13. Finish filling in the Peru part of your chart. Then, looking at the charts, answer the following questions:

    a. What changes do you note in settlement patterns from Huaca Prieta to Cuzco? Why do you think these changes came about?

    b. What changes came about in patterns of leadership: Why did they occur?

    c. When did distinct social classes develop? How do you think they came about?

    d. In what order did the various industries come into being? Why do you think they are in this order?

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e. What changes were there in the quality and quantity of goods and services produced? How do you explain these changes?

f. Do you note any changes in other aspects of culture? What?

14. Turn to the criteria you compiled for civilization in Mesopotamia. Do these apply equally well to civilization in Peru?

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15. Turn to your chart. Looking horizontally across the chart, what similarities and differences do you note in Peru and Mesopotamia at approximately the same stage of development?

	Similarities	Differences
Mesopotamia Peru		
Sumer Imperialist		
Early Dynastic Expansionist		
Proto-Literate Florescent		
Ubaid Formative		
Village farmers Early farmers		

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THEORIES

1. RACIAL GENIUS CAUSED CIVILIZATIONS TO DEVELOP

Today there are peoples in the world such as the Australian aborigines and the African Bushmen who still practice a hunting and gathering way of life. Most Eskimos were hunters and gatherers until recently. But there are also peoples in the world who have the technological know-how to build skyscrapers, produce enormous food surpluses, and send rockets to the moon. Why did some peoples develop civilization but not others?

There must have been some inherent characteristics of certain races that enabled these races but not others to develop civilization. Two of these inherited characteristics must have been greater energy and greater intelligence. The superior races, then, developed civilization and the inferior races didn't. Even when inferior races lived in favorable environments, they couldn't develop civilization because they lacked the genius of more favored races. The only way inferior races might have been able to obtain some aspects of civilization would have been to adopt them from other more gifted races.

b. What do you think about this theory? Is it accurate or not? Why do you think so?

2. FAVORABLE PHYSICAL ENVIRONMENTS CAUSED CIVILIZATIONS TO DEVELOP

The physical environment was the principal factor in the development of civilization. The early civilizations arose in particularly favorable environments where food and water were readily available and the soils were fertile. The relationships of the developing cultures with these favorable environments led to a better and better use of the resources in the environments, and so these good environments caused civilizations to develop.

c. What do you think about this theory? Is it accurate or not? Why do you think so?

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THEORIES

3. Read the following article describing the Irrigation Theory for the development of civilization.

THE DEVELOPMENT OF LARGE-SCALE IRRIGATION SYSTEMS CAUSED CIVILIZATIONS TO DEVELOP

The development of complex, large-scale irrigation systems had repercussions in the technical, social, and economic spheres that caused civilizations to develop. The largest and most important systems of irrigation coincide with the greatest densities of population, the most important urban areas, and the centers of political power and military expansion. Why might this be the case?

Water appears unevenly in the landscape. In some areas there is little rainfall but the soils would be good for farming if only water could be brought to them. Farmers in these areas had to secure reliable sources of water, and so they discovered and turned to irrigation to do this.

Irrigation farming naturally requires more effort than simple rainfall farming. Small, local tasks related to irrigating may be done by a single man or family or a small group of neighbors, but complex, large-scale irrigation projects can only be done by large groups of people. In Egypt, for instance, water must be diverted from the Nile and made to flow into a network of shallow irrigation canals. The canals must first be dug and then periodically cleaned and maintained. Banks of earth or dikes have to be built to keep the canals from flooding. A lot of people are needed to keep this complex system of irrigation in operating order.

These large groups of people must work cooperatively in order to get the work done. There need to be leaders to coordinate the work and central planning to organize it. The sheer scope of the tasks necessary to manipulate a large amount of water demands centralized leadership.

In the resulting irrigated fields, farmers can grow more crops. This encourages them to accept leaders, who are supported by the surplus food so they can withdraw from farming and take up the leadership tasks. These leaders may also have ceremonial duties, keeping the gods happy so the harvest will be large. Gradually, the irrigation systems become larger and larger and extend over more and more territory. Authority becomes more centralized and leaders possess more power and wealth and their influence is felt throughout the land. Great palaces and temples can be built. The result was that:

> "The hydraulic agriculturalists outgrew and outfought the majority of all neighboring peoples wherever local conditions and international circumstances one-sidedly favored an agro-managerial economy and statecraft."[1]

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1. p. 19. Karl A. Wittfogel. Oriental Despotism: A Comparative Study of Total Power. New Haven: Yale University Press, 1959.

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a. What was the Irrigation Theory? Summarize below the important features of the theory in your own words.

b. How does this theory differ from the racial and environmental theories?

c. Does this theory adequately explain <u>why</u> civilizations developed?

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THEORIES

5. As you read the following article be thinking about this question. Then answer the question after you have finished the article.

How does the approach described below differ from the theories we have been discussing?

Many serious scholars think that it is not useful to ask the question "why?" about the emergence of civilization, since the question can never really be answered to everyone's satisfaction. Instead, they are concentrating on answering the question "how?" They feel that, if there are any real causes for the emergence of civilization, these causes must be a part of the cultural development itself.

A number of theories have been used to describe how civilizations emerged. One theory states that all men passed through essentially the same stages in their cultural development. One formulation of this theory stated that man passed from "savagery" to "barbarism" to "civilization." We would quibble with the first two terms since their use is obviously the result of value judgments, but what about the theory itself? Did all men pass through exactly the same stages? Probably not. And are not the stages above so general that they would not be useful in describing particular cultures?

According to some persons, civilization developed only once, in one spot, and diffused from this place to other parts of the world. We have already seen that this is incorrect. Civilization arose independently in at least two places--in Old and New Worlds. Dr. Julian Steward, in his book Theory of Culture Change, stated that he thought there were many lines of cultural development, some of which led to civilization and some of which didn't. He noted both similarities and differences in the chains of events in cultural development in different parts of the world.

Dr. Steward noted both similarities and differences in the chains of events in cultural development in different parts of the world. He tried to find which developments were related to each other. He noted that certain general types of cultures often developed in similar ways in similar conditions, but that the specifics of cultures did not appear among cultures in regular sequences.

For instance, patrilineal bonds occur cross-culturally with great regularity among some peoples who have certain traditions and who live in certain environments. But not all peoples live under exactly the same traditions or in exactly the same environments, so not all peoples who live in patrilineal bands eat the same foods or live in the same kinds of houses. The same is true for other levels of social and cultural integration, such as the hunting band level or the level of early civilizations.

Dr. Steward also stated that any given level is preceded by other, earlier developments. For instance, local government of some sort preceded regional government. He also emphasized the cause and effect relationships within each

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level of social and cultural integration. For instance, more craft specialization affected the development of cities which affected thepolitical institutions, etc.

According to Dr. Steward, the process of cultural development involves the increasing complexity of culture, but he does not try to provide a cultural explanation of all human cultural development. He takes into account the different physical environments and different culture histories of man's differing cultures. He does not try to find one basic cause for the development of civilization.

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